EURORIDER

RIGID AXLE

397E.12.31-ER
397E.12.31A-ER
397E.12.35-ER
397E.12.35A-ER
(Engine F2B)

397E.12.43-ER
397E.12.43A-ER
(Engine dCi11)

INDEPENDENT WHEEL SUSPENSION

397E.10.31-SRI
397E.10.31A-SRI
397E.10.35-SRI
397E.10.35A-SRI
397E.12.31-SRI
397E.12.31A-SRI
397E.12.35-SRI
397E.12.35A-SRI
(Engine F2B)

397E.12.43-SRI
397E.12.43A-SRI
(Engine dCi11)

Rule for vehicle equipment

Strictly follow the instructions given for proper operation and reliability of vehicle parts.

Due to the natural and constant product development, certain parts contained in this document could not be updated.

Publication Edited by:
IRISBUS ITALIA S.p.A
Via Puglia, 35
10156 Torino - TO - Italy

Printed **603.93.171** - 1st Ed. 2003

Produced by:

SATIZ msx
INTERNATIONAL
An MSX International Company

B.U. TECHNICAL PUBLISHING
C.so Svizzera, 185
10149 Torino (Italy)

EURORIDER CURSOR (F2B) - dCi 11
397E.10.31 - 397E.10.35
397E.12.31 - 397E.12.35 - 397E.12.43

Rule for vehicle equipment

Print 603.93.171 - 1st Edition
Base - March 2003

UPDATING STATUS

Section	Description	Page	Revision date

	SECTION
GENERAL INFORMATION	1
SPECIFIC CHASSIS AND BODY INSTRUCTIONS	2
PRODUCT COMPLIANCE (ELEMENTS SUBJECT TO REGULATION: EEC, ECE, etc.) TO BE REQUESTED TO BODY REPAIRERS AND THEIR CASCADE SUPPLIERS	3
HOT ROLLED/DRAWN STEEL AND SCHEDULED PAINTING/PROTECTION	4
PROCEDURES FOR DAMAGES AND/OR DENTS TO VEHICLES FORWARDED TO BODY REPAIRERS	5

Alphabetical index to subjects

Sect / Page

A

Abrasionproof coating (optional) 4-10/4-13
AC system assembly requirements 2-34
Accessibility for maintenance 2-21
ADJUSTABLE DEVICES AND COVERS 2-66
ADJUSTING THE HEIGHT OF THE DRIVER'S SEAT 2-73
AFTER SALES REGULATION FOR BODY REPAIRERS 1-8
ALIGNMENT 2-60
Alternator cooling 2-28
Annex (A) [Damages/missing parts service sheet] 5-9
Annex (B) [Static checkouts on the chassis] 5-10
Annex (B) [Running vehicle operation test] 5-10
Annex (C) [Procedures to be followed upon the vehicle arrival at the warehouse (buses and chassis)] 5-11
Annex (D) [Maintenance of finished buses stored into warehouses] 5-11
Annex (E) [Maintenance of the chassis in the Body maker warehouse] 5-17
ANTIRUST BODY TREATMENT 2-40
Antirust protection maintenance 2-41
Antirust protection tests 2-41
Antirust protection using other materials 2-41
Antirust treatment inside sections 2-40
Antirust treatment on external structure 2-40
APPLICATION 2-79
Application of antirust treatment on sheets 2-40
Assembly measurements 2-11/2-78

B

BASIC BODY CONFIGURATION REQUIREMENTS 2-19
Battery compartment 2-4
Blinker 2-52
BODY CONFIGURATION 2-36
BODY CONSTRUCTION 2-36
BODY ELECTRICAL SYSTEM 2-52
Body identification plates and labels 2-34
Body maker supply 1-6
BODY PAINTWORK 2-42

Body panelling 2-39
Body spare parts 1-5

C

”Cab” ”frame”, ”frame” and ”chassis” painting cycle 4-13
CAN line assembly 2-32
CENTRAL STRUCTURE CONFIGURATION 2-64
Centre of gravity 2-10/2-77
CERTIFICATE OF FITNESS FOR IVECO CHASSIS EQUIPMENT 3-13
CHARACTERISTICS OF THE DRIVER’S SEAT 2-36
CHASSIS ACCEPTANCE 1-8
CHASSIS DELIVERY 2-60
CHASSIS DELIVERY AND STORAGE 2-7
CHASSIS OVERHAUL FOR COMPLETED BUSES 1-9
CHASSIS PREPARATION 2-60
Checkout procedures 3-10
Chemical composition % 4-6
Classification and features to be checked 4-5
Clutch level line 2-68
Clutch reservoir 2-24
Coat of paint checking 4-14
Cold climate isolation 2-48
CONDITIONS FOR APPROVING A THIRD PARTY BODY ON AN IVECO CHASSIS 3-16
Control, measuring and testing equipment checkout 3-9
Controls during manufacturing 3-11
Corrective interventions 3-9
COUPON 1-10
CUTTING THE CHASSIS 2-62
”01” CYCLE - BUSES AND DERIVED VEHICLES, OVERSIZE BODIES, DUMPERS, TANKERS, TRAILERS, SEMITRAILERS, TRUCK MIXERS, ETC. 4-9
”02” CYCLE - MODIFIED CHASSIS 4-11
”03” CYCLE - MODIFIED CABS/BODIES (PLATES ASSEMBLED ON STRUCTURES WITH COMPLETE AND ORIGINAL IRISBUS PAINT) 4-12
”04” CYCLE - CAB AND/OR CHASSIS RE-PAINTING (THE SAME OR A DIFFERENT COLOR FROM THE ORIGINAL ONE) 4-13

D

DEFINITIONS 3-5
Delivery 2-7
Delivery at the Body maker expense 5-8

Direct sale by IRISBUS and through the Body maker 1-10
Direct sale through Body repairers. 1-9
Display assembly (397E.12.43) 2-38
Documents 3-8/3-16

E

Earth point distribution on chassis 2-56
ECUs 2-28/2-31
Electrical panel 2-31
Electrical system 2-67
Electrical system confluence 2-30
Electrical system precautions 2-27
Engine air suction 2-22
Engine cooling 2-25
Ex destination delivery 5-6
Ex shop or ex established parking delivery 5-5
Exhaust 2-24
External noise 2-42
External servicing flaps 2-22

F

FASTENING OF BODY TO CHASSIS 2-12
Fastening of body to chassis by welding 2-14
Final product checkout and testing 3-11
Front hydraulic brake reservoir (rigid axle version only) 2-24
Fuel line 2-68
FUNCTIONAL ROAD TESTS TO BE CARRIED OUT BY OUTFITTER 2-50

G

Gear lever wire handling procedure 2-69
General chassis modification rules 2-12
General features 3-7
General information 1-5/4-5/4-9/5-5

H

Heat isolation 2-48
HEATING SYSTEM AND SELF-STANDING HEATER 2-56
Heating system coolant confluence 2-32
High elastic limit steel specifications 4-7

HOT-ROLLED/DRAWN STEEL 4-5
HOT ROLLED/DRAWN STEEL AND SCHEDULED PAINTING/PROTECTION 4-5

I

INDICATIONS AND DATA ON WEIGHTS AND SIZES 2-8/2-77
INTERNAL CONFIGURATION AND VEHICLE CAPACITY 2-36
Internal noise - measuring method 2-42
Internal servicing flaps 2-21
INTRODUCTION 2-36/2-60/2-40
IRISBUS direct sale 1-9
IRISBUS supply to the Body maker 1-6

L

LIABILITIES BEFORE THIRD PARTIES 3-12
Loading the chassis onto ships, trains, etc. 2-7
Lowering the driver's seat 2-75

M

Main dimensions 2-36
MAINTENANCE FOR VEHICLES STORED IN THE WAREHOUSE 1-10
MANDATORY ARRANGEMENT 2-79
MANUFACTURER'S IDENTIFICATION 2-58/2-78
10.8 METRE VERSION 2-77
MODULAR BODY VERSION 2-60
Module protection 4-13
Movement of units and fastening of supplementary equipment 2-26

N

NOISE LEVELS AND THERMAL ISOLATION 2-42
Non-compliance management 3-11

O

Organic material requirements for fire prevention purposes 2-39
Other 2-35

P

Painting cycle 4-10/4-12
Painting/protection cycle classification, according to the equipment type 4-9
Particular procedures 4-10/4-11/4-13/4-14
PERFORATING THE CHASSIS 2-17
Plate pretreatment 4-9/4-12

Plate pretreatment and painting cycle 4-11
Plates and strips reference cold bending fitness 4-8
Pneumatic system 2-67
Precautions for welding, grinding and painting mechanical components during body fitting 2-28
Preliminary body assembly operations 2-12
Preparation of the structure 2-40
PROCEDURES FOR DAMAGES AND/OR DENTS TO VEHICLES FORWARDED TO BODY REPAIRERS 5-5
PRODUCT COMPLIANCE (ELEMENTS SUBJECT TO REGULATION: EEC, ECE, etc.) TO BE REQUESTED TO BODY REPAIRERS AND THEIR CASCADE SUPPLIERS 3-5
Product protection and storage 3-12
Project documentation control 3-9
Protection of air springs 2-20
PROVISIONS 1-6
Purchased product control 3-10
Purpose 4-9

R

Raising the driver's seat 2-73
Raw drawn steel specifications 4-8
Re-painting plastic components painted in a different color from the cab one (bumpers, fenders, radiator grid and step) 4-13
Rear light connections 2-56
Registers 3-8
REGISTRATION BOOK 1-7
RELATIONSHIPS BETWEEN MANUFACTURER AND SUPPLIER 3-6
RESISTANT STRUCTURE MATERIAL 2-39
Resistant structure tubes 2-39
Riveting technical requirements 2-39
RTU (ROUTINE TUNING UP) 1-9
RULES AND INSTRUCTIONS 1-5
RULES FOR BODY REPAIRERS USING IVECO SAFETY PARTS 3-12
Running vehicle operation test 5-10

S

Safety 2-32
Sale through IRISBUS distributor 1-10
SCHEDULED PAINTING/PROTECTION 4-9
SCOPE 3-5/4-5
Soundproofing 2-44
SPECIFIC CHASSIS AND BODY INSTRUCTIONS 2-7

SPECIFIC CHASSIS INSTRUCTIONS 2-7
Specifications 4-7
Spot welding 2-17
Stamping protection 4-10
Steering 2-23
Steering lines 2-67
Storage 2-8
STRUCTURE OF THE PRODUCT COMPLIANCE CONTROL SYSTEM 3-6
SYSTEM ASSEMBLY 2-66
System organization, planning, checkouts and revisions 3-7

T

TARGETS 3-5
TECHNICAL INFORMATION 1-6
TECHNICAL VEHICLE SYSTEM REQUIREMENTS 2-21
Technical welding requirements 2-15
TRANSPORTING AND LOADING THE VEHICLE CHASSIS TRANSPORTATION WITHOUT BODY 2-7
Type of material 4-5

U

Utility air vents 2-27

V

Vehicle delivery by IRISBUS-established carrier 5-8
Vehicle delivery to the Body maker workshop 5-8
Vehicle delivery to the shop after equipping 5-8
Vehicle part malfunctions 5-8
Vehicle repairing 5-7
Vehicle withdrawal 5-5

W

Weight 2-8
Weight table 2-8/2-77
Wheel hub cap 2-20
Wheelhouses 2-19
Wheels and tyres 2-20
Windscreen wiper timer 2-52
WORK ORDER COMPONENT CONSISTENCY 1-6

I. GENERAL INFORMATION

Index

1.	**GENERAL INFORMATION**	**1-5**
1.1	RULES AND INSTRUCTIONS	1-5
1.1.1	Body spare parts	1-5
1.2	TECHNICAL INFORMATION	1-6
1.2.1	IRISBUS supply to the Body maker	1-6
1.2.2	Body maker supply	1-6
1.3	WORK ORDER COMPONENT CONSISTENCY	1-6
1.4	PROVISIONS	1-6
1.5	REGISTRATION BOOK	1-7
1.6	AFTER SALES REGULATION FOR BODY REPAIRERS	1-8
1.7	CHASSIS ACCEPTANCE	1-8
1.8	CHASSIS OVERHAUL FOR COMPLETED BUSES	1-9
1.9	RTU (ROUTINE TUNING UP)	1-9
1.9.1	IRISBUS direct sale	1-9
1.9.2	Direct sale through Body repairers	1-9
1.9.3	Sale through IRISBUS distributor	1-10
1.10	COUPON	1-10
1.10.1	Sale through IRISBUS distributor	1-10
1.10.2	Direct sale by IRISBUS and through the Body maker	1-10
1.11	MAINTENANCE FOR VEHICLES STORED IN THE WAREHOUSE	1-10

1 GENERAL INFORMATION

The instructions given in this section aim at the following targets:

- Ensure, in all cases, the mechanical groups making up the chassis work properly.
- Act as compulsory regulation for both IRISBUS shops and external Body repairers, if manufacturing bodies on behalf of IRISBUS .
- Define the quality standard to be achieved for external Body repairers, self-equipping IRISBUS chassis.
- Set the standard relationship between IRISBUS -Body repairers and subcontractors as for production processing control and final product technical compliance regulation.
- Define the Body maker obligations as for works involving safety parts.
- Determine the Body maker liabilities before and after the IRISBUS authorization achievement.
- Define the IRISBUS -Body maker obligations as for the product direct liability.
- Define the Body maker obligations as for the warehouse and modified vehicle quality management, as well as warranty procedures.

We remember that the Body maker cooperation with IRISBUS assumes he is a capable professional, always able to best exploit his technical and organization capacities. Therefore, IRISBUS takes for granted that his implementations shall always be carried out in compliance with professional rules. The following issues are not exhaustive and simply provide basic rules and provisions, which can be further developed.

Faults or defects due to total or partial failure to comply with the current regulation could not be covered by the chassis warranty, chassis mechanical groups included.

1.1 RULES AND INSTRUCTIONS

The Body maker shall be totally liable for the body project and implementation, in order for the vehicle to provide the necessary performances and reliability.

Therefore, he shall:

- Comply with the rules supplied by the current equipment instructions.
- Not modify the chassis without the IRISBUS written authorization.
- Build the body structure so to incorporate it within the IRISBUS chassis, by taking particular care as for frame seams.

1.1.1 Body spare parts

The Body maker agrees to ensure the supply of spare parts for a minimum period of 10 years, starting from the last ordered body, and for all the assembled parts and components.

1.2 TECHNICAL INFORMATION

1.2.1 IRISBUS supply to the Body maker

- Operation and Maintenance Manual, including chassis specifications.
- Chassis complete project, including dimensions essential to the Body maker.
- Equipment instructions, including information essential to the body manufacturing (heating intakes, leveling stands, etc.).
- Diagrams of the electric, pneumatic and hydraulic systems, including data necessary to the Body maker (authorized intakes, powers, etc.).

1.2.2 Body maker supply

For each equipped vehicle delivered, the Body maker will provide Operation and Maintenance instructions for the body and the related components, which will complete the manual supplied by IRISBUS along with the chassis.

Moreover, a spare parts catalog of the body and related components shall be supplied to the Body maker.

1.3 WORK ORDER COMPONENT CONSISTENCY

All vehicles belonging to a same work order shall be equipped with components of a same brand, model and quality.

1.4 PROVISIONS

The body maker shall always consider and check the final product fully compliance with all applicable legal provisions for this type of vehicles, namely: local government/self-governing body/national regulations enforced in each Country where they are registered and/or used (Road Traffic Code, Official Rules, etc.), international rules (European Union Regulations, UNO/Geneva ECE Regulations, etc.), as well as all those instructions relevant to accident prevention, servicing instructions, environment, etc.

Note that the current equipment regulation only quotes recommendations concerning the applicable law, accident prevention provisions or other information which, in our opinion, can be considered as the most important ones. They are not meant to supersede or relieve the body maker commitment and liability to constantly update his sources of information.

For this reason, IRISBUS is not held liable for consequences due to mistakes resulting from poor knowledge or wrong construction of the currently enforced legal provisions.

1.5 REGISTRATION BOOK

Current national laws do not provide for registration books related to chassis meant for passenger vehicles. Therefore, the complete final product (equipped vehicle) contractor or purchaser shall have to require the registration book, provided no specific agreements have been made with IRISBUS .

IRISBUS will make all the necessary chassis documents available, so to obtain the equipped vehicle registration and the relevant registration book (in Spain, the class approval according to Royal Decree 2140/86 and the chassis manufacturing certificate).

1.6 AFTER SALES REGULATION FOR BODY REPAIRERS

This chapter defines liabilities for the works to be carried out onto IRISBUS passenger vehicle chassis, according to the following categories:

- sales to the distributor
- sales to the Body maker
- sales account

This in order to clearly define liabilities of whoever uses IRISBUS produced, controlled, supplied and delivered chassis (for passenger vehicles).

Obviously, if problems arise due to transportation, lack of materials and transit, IRISBUS will fully acknowledge and take its own liabilities, as provided for in the regulation.

The following paragraphs deal with various issues, namely:

- chassis acceptance
- checkout/overhaul
- routine tuning up (RTU before delivery)
- coupons
- warehouse maintenance

1.7 CHASSIS ACCEPTANCE

The Body maker receiving a chassis from IRISBUS or a distributor shall perform a preliminary overhaul on the chassis acceptance, directly notifying missing parts or damages to the carrier.

This includes checking boxes of materials possibly supplied, compared to the enclosed sheet.

Any remark must be written on the sheet, listing damages and missing parts (See Annex A, Chapter 5), enclosed with the delivery note; then the sheet must be signed by the carrier for acceptance.

This delivery note, with the enclosed survey sheet, will be sent to IRISBUS, After Sales department, which will ask the relevant IRISBUS shop Quality manager to supply the missing material.

As for in transit damages or missing parts (not notified by IRISBUS), the receiver shall follow the instructions given in Chapter 5 “Procedures for damages and/or dents on vehicles forwarded to Body repairers”.

IRISBUS shall not be held liable for missing parts and/or damages detected after the chassis acceptance; therefore, the Body maker shall borne all repair costs.

1.8 CHASSIS OVERHAUL FOR COMPLETED BUSES

During the delivery stage, the Body maker will perform, directly or by means of the IRISBUS service network a functional checkout on the chassis, as specified in Annex B, Chapter 5. The relevant costs shall be fully borne by the Body maker.

This annex lists all checks to be performed on completed vehicles, in order to correct defects possibly arisen during processing and assess the equipped vehicle overall functionality.

Any defect or fault detected in the chassis mechanical members shall be notified by writing, according to the Body maker testing procedures, to the local After Sales department manager which, having seen the fault, shall choose whether to apply the RTU (routine tuning up) corrective intervention at an IRISBUS servicing branch shop.

The costs for servicing interventions covered by the warranty shall be refunded according to the IRISBUS current procedures.

At the end of these operations, the vehicle shall be considered as delivered in all respects, faultless and ready to use.

1.9 RTU (ROUTINE TUNING UP)

1.9.1 IRISBUS direct sale

RTU must be performed by the IRISBUS servicing network (Servicing organization or a distributor).

a) RTU performed by IRISBUS Servicing organization: upon the vehicle delivery to the client, the suitable sheet is detached from the warranty booklet and sent, enclosed to the invoice, to the distributor which contacted the Authorized Workshop, who will forward it to IRISBUS, according to the defined procedures.

b) RTU performed by the distributor: upon the vehicle delivery to the client, the suitable sheet is detached from the warranty booklet and forwarded to IRISBUS, according to the defined procedures.

1.9.2 Direct sale through Body repairers.

As above.

1.9.3 Sale through IRISBUS distributor

RTU is up to the distributor. If the client directly withdraws his equipped vehicle from the Body maker RTU, on the distributor request, can be performed at a local authorized workshop, which will charge the cost to the distributor who sold the vehicle; the latter shall recover according to the IRISBUS procedures.

NOTE: It is understood that the above mentioned procedure is not inclusive of payments for works on the chassis, concerning the functionality of both components added by the Body maker (air conditioning , etc.) and parts and equipment already existing on the chassis and used by the Body maker (relays, electric system control boards, etc.).

1.10 COUPON

The "Servicing Coupon", for the chassis only, shall be issued by the IRISBUS Servicing organization. The interventions shall be performed according to the procedure described in the warranty manual. Otherwise, the warranty will be nullified.

1.10.1 Sale through IRISBUS distributor

The distributor who sold the vehicle shall follow the normal procedure as for issuing the "COUPON".

1.10.2 Direct sale by IRISBUS and through the Body maker

a) Coupon issued by the IRISBUS Servicing organization: the suitable sheet shall be detached from the warranty manual and sent, enclosed to the invoice, to the relevant distributor.

b) Coupon issued by the distributor: the distributor shall detach the suitable sheet from the warranty manual and send it, enclosed to the invoice, to the Regional Direction.

1.11 MAINTENANCE FOR VEHICLES STORED IN THE WAREHOUSE

(Equipped vehicles and chassis)

In order to keep in good condition and operation new equipped vehicles and chassis used by Body repairers which must be stored in the warehouse for a given time, a maintenance schedule has been defined, from storage to final delivery to the client.

As for vehicles stored in areas under direct IRISBUS liability, several warehouse maintenance procedures have already been enforced, at predefined intervals.

Remember that, as soon as the goods are taken under our sales network (complete vehicles) or external Body repairers (passenger vehicle chassis) liability, these shall be held responsible for the proper maintenance. They shall act so as to ensure vehicles are delivered in the best functional and aesthetic conditions.

Annexes C, D and E of Chapter 5 list all the operations provided for, divided into complete vehicles and chassis as well as the recommended maintenance schedule for the vehicle optimum maintenance.

The maintenance schedule shall be followed starting from the date of this paper and registered on the "Maintenance sheet" which, on request, shall be shown to IRISBUS survey personnel
For a better understanding, we specify that the maintenance schedule shall apply to all chassis: those sold to the distributor or Body maker as well as those on "sales account" and "work account.

2. SPECIFIC CHASSIS AND BODY INSTRUCTIONS

Index

2	**SPECIFIC CHASSIS AND BODY INSTRUCTIONS**	**2-7**
2.1	SPECIFIC CHASSIS INSTRUCTIONS	2-7
2.2.	TRANSPORTING AND LOADING THE VEHICLE CHASSIS TRANSPORTATION WITHOUT BODY	2-7
2.2.1	Loading the chassis onto ships, trains, etc.	2-7
2.3	CHASSIS DELIVERY AND STORAGE	2-7
2.3.1	Delivery	2-7
2.3.2	Storage	2-8
2.4	INDICATIONS AND DATA ON WEIGHTS AND SIZES	2-8
2.4.1	Weight	2-8
2.4.2	Weight table	2-8
2.4.3	Centre of gravity	2-10
2.4.4	Assembly measurements	2-11
2.5	FASTENING OF BODY TO CHASSIS	2-12
2.5.1	General chassis modification rules	2-12
2.5.2	Preliminary body assembly operations	2-12
2.5.3	Fastening of body to chassis by welding	2-14
2.5.4	Technical welding requirements	2-15
2.5.5	Spot welding	2-17
2.6	PERFORATING THE CHASSIS	2-17
2.7	BASIC BODY CONFIGURATION REQUIREMENTS	2-19
2.7.1	Wheelhouses	2-19
2.7.2	Protection of air springs	2-20
2.7.3	Wheels and tyres	2-20
2.7.4	Wheel hub cap	2-20
2.8	TECHNICAL VEHICLE SYSTEM REQUIREMENTS	2-21
2.8.1	Accessibility for maintenance	2-21
2.8.2	Internal servicing flaps	2-21
2.8.3	External servicing flaps	2-22
2.8.4	Engine air suction	2-22
2.8.5	Steering	2-23
2.8.6	Exhaust	2-24
2.8.7	Front hydraulic brake reservoir (rigid axle version only)	2-24
2.8.8	Clutch reservoir	2-24

2.8.9	Engine cooling	2-25
2.8.10	Movement of units and fastening of supplementary equipment	2-26
2.8.11	Utility air vents	2-27
2.8.12	Electrical system precautions	2-27
2.8.1.2.1	ECUs	2-28
2.8.13	Precautions for welding, grinding and painting mechanical components during body fitting	2-28
2.8.14	Alternator cooling	2-28
2.8.15	Electrical system confluence	2-30
2.8.15.1	Electrical panel	2-31
2.8.15.2	ECUs	2-31
2.8.15.3	CAN line assembly	2-32
2.8.15.4	Safety	2-32
2.8.16	Heating system coolant confluence	2-32
2.8.17	AC system assembly requirements	2-34
2.8.18	Body identification plates and labels	2-34
2.8.19	Other	2-35
2.9	BODY CONSTRUCTION	2-36
2.10	INTRODUCTION	2-36
2.11	BODY CONFIGURATION	2-36
2.11.1	Main dimensions	2-36
2.12	INTERNAL CONFIGURATION AND VEHICLE CAPACITY	2-36
2.13	CHARACTERISTICS OF THE DRIVER'S SEAT	2-36
2.13.1	Display assembly (397E.12.43)	2-38
2.14	RESISTANT STRUCTURE MATERIAL	2-39
2.14.1	Resistant structure tubes	2-39
2.14.2	Body panelling	2-39
2.14.3	Riveting technical requirements	2-39
2.14.4	Organic material requirements for fire prevention purposes	2-39
2.15	ANTIRUST BODY TREATMENT	2-40
2.15.1	Introduction	2-40
2.15.2	Preparation of the structure	2-40
2.15.3	Antirust treatment inside sections	2-40
2.15.4	Antirust treatment on external structure	2-40
2.15.5	Application of antirust treatment on sheets	2-40
2.15.6	Antirust protection using other materials	2-41

2.15.7	Antirust protection tests	2-41
2.15.8	Battery compartment	2-41
2.15.9	Antirust protection maintenance	2-41
2.16	BODY PAINTWORK	2-42
2.17	NOISE LEVELS AND THERMAL ISOLATION	2-42
2.17.1	External noise	2-42
2.17.2	Internal noise - measuring method	2-42
2.17.3	Soundproofing	2-44
2.17.4	Heat isolation	2-48
2.17.5	Cold climate isolation	2-48
2.18	FUNCTIONAL ROAD TESTS TO BE CARRIED OUT BY OUTFITTER	2-50
2.19	BODY ELECTRICAL SYSTEM	2-52
2.19.1	Blinker	2-52
2.19.2	Windscreen wiper timer	2-52
2.19.3	Rear light connections	2-56
2.19.4	Earth point distribution on chassis	2-56
2.20	HEATING SYSTEM AND SELF-STANDING HEATER	2-56
2.21	MANUFACTURER'S IDENTIFICATION	2-58
2.22	MODULAR BODY VERSION	2-60
2.23	INTRODUCTION	2-60
2.24	CHASSIS DELIVERY	2-60
2.25	CHASSIS PREPARATION	2-60
2.26	ALIGNMENT	2-60
2.27	CUTTING THE CHASSIS	2-62
2.28	CENTRAL STRUCTURE CONFIGURATION	2-64
2.29	ADJUSTABLE DEVICES AND COVERS	2-66
2.30	SYSTEM ASSEMBLY	2-66
2.30.1	Steering lines	2-67
2.30.2	Electrical system	2-67
2.30.3	Pneumatic system	2-67
2.30.4	Fuel line	2-68
2.30.5	Clutch level line	2-68
2.30.6	Gear lever wire handling procedure	2-69
2.31	ADJUSTING THE HEIGHT OF THE DRIVER'S SEAT	2-73

2.31.1	Raising the driver's seat	2-73
2.31.2	Lowering the driver's seat	2-75
2.32	10.8 METRE VERSION	2-77
2.33	INDICATIONS AND DATA ON WEIGHTS AND SIZES	2-77
2.33.1	Weight table	2-77
2.33.2	Centre of gravity	2-77
2.33.3	Assembly measurements	2-78
2.34	MANUFACTURER'S IDENTIFICATION	2-78
2.35	MANDATORY ARRANGEMENT	2-79
2.36	APPLICATION	2-79

2 SPECIFIC CHASSIS AND BODY INSTRUCTIONS

2.1 SPECIFIC CHASSIS INSTRUCTIONS

2.2 TRANSPORTING AND LOADING THE VEHICLE CHASSIS TRANSPORTATION WITHOUT BODY

The chassis without body must be transported using a semi-trailer suitable for the type of bus.

2.2.1 Loading the chassis onto ships, trains, etc.

The chassis must be lifted from the axles or wheels to be loaded onto ships, railway carriages, etc.
Never fasten crane cables to cross-members or side-members.
Anchor the chassis to the transportation vehicle by the axles only.
The chassis weight will be supported by the wheels.

2.3 CHASSIS DELIVERY AND STORAGE

2.3.1 Delivery

The chassis is carefully inspected before delivery by IRISBUS.
The chassis must be inspected again by the outfitter following delivery to identify anomalies which may have arisen during transportation. IRISBUS will not accept claims for material faults or anomalies arising during transportation after delivery and not stated in the consignment notes signed by the forwarding agent.
Outfitters will follow the instructions in article 1.6 of "After-Market Standard for Outfitters" (see chapter 1) on how to fill in the consignment notes correctly.
The vehicle identification number, printed on the right side-member in front of the air spring mount, shall be quoted in the claim.
See figure 2.1 for stiff axle and third axle versions and figure 2.2 for independent wheel suspension versions.

Figura 2.1 (stiff axle versions)

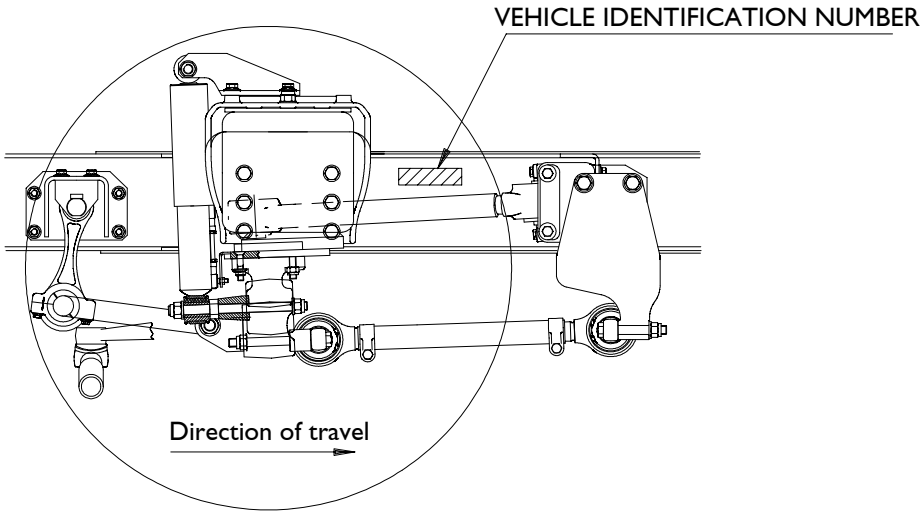
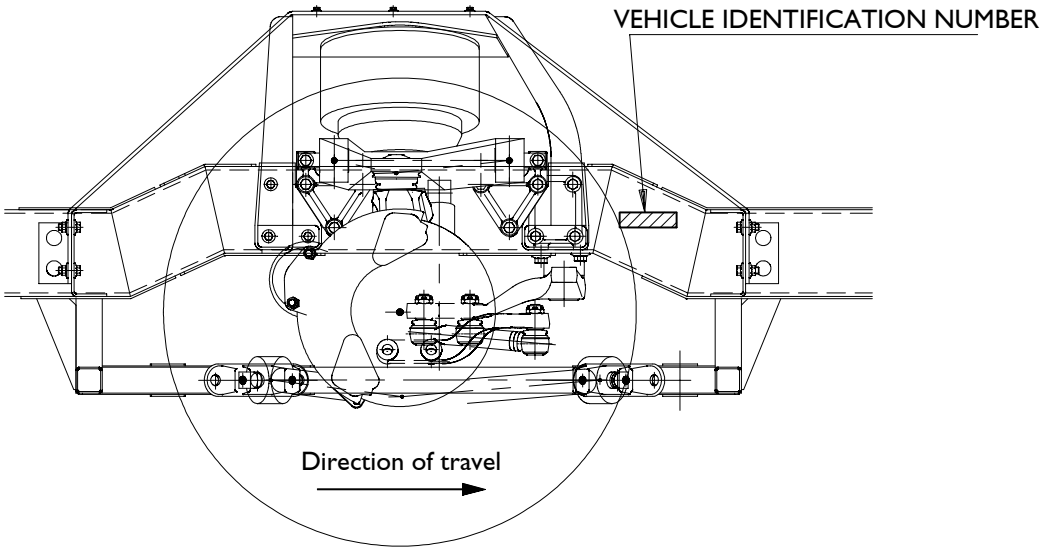


Figura 2.2 (independent wheel suspension versions)



2.3.2 Storage

Protect the vehicle suitably if storage is required after delivery inspections according to storage time and environmental characteristics of the area.

Outfitters will be responsible for suitably protecting the most delicate components, such as dashboard, battery, relay and fuse box, etc., to ensure durability and reliability.

Follow the instructions shown in paragraph 1.11 "Stored vehicle maintenance".

2.4 INDICATIONS AND DATA ON WEIGHTS AND SIZES

2.4.1 Weight

The body design and the conditions of the seats and the luggage compartment must not exceed the maximum established loads. The values refer to each axle and to the total weight.

Manufacturing tolerance of ±5% must be considered for all data.

2.4.2 Weight table

Type	Chassis kerb weight (1)	Maximum technically admissible weight (2)	Maximum authorised weight (2)
397E.12.31/35-ER			
Front axle	960	6700	6700
Rear axle	4820	12000	11500
Total	5780	18000	18000
397E.12.31A/35A-ER			
Front axle	990	6700	6700
Rear axle	4730	12000	11500
Total	5720	18000	18000

Type	Chassis kerb weight (1)	Maximum technically admissible weight (2)	Maximum authorised weight (2)
397E.12.31/35-SRI			
Front axle	960	6700	6700
Rear axle	4820	12000	11500
Total	5780	18000	18000
397E.12.31A/35A-SRI			
Front axle	960	6700	6700
Rear axle	4730	12000	11500
Total	5720	18000	18000
397E.12.43-ER			
Front axle	960	6700	6700
Rear axle	4820	12000	11500
Total	5780	18000	18000
397E.12.43A-ER			
Front axle	990	6700	6700
Rear axle	4730	12000	11500
Total	5720	18000	18000
397E.12.43-SRI			
Front axle	960	6700	6700
Rear axle	4820	12000	11500
Total	5780	18000	18000
397E.12.43A-SRI			
Front axle	990	6700	6700
Rear axle	4730	12000	11500
Total	5720	18000	18000

(1) Vehicle ex works, BOGIE version, 3000 mm wheelbase (with fuel, oil and fluids, batteries, spare tyre, without driver)

(2) Standard Spanish type-approved version.

2.4.3 Centre of gravity

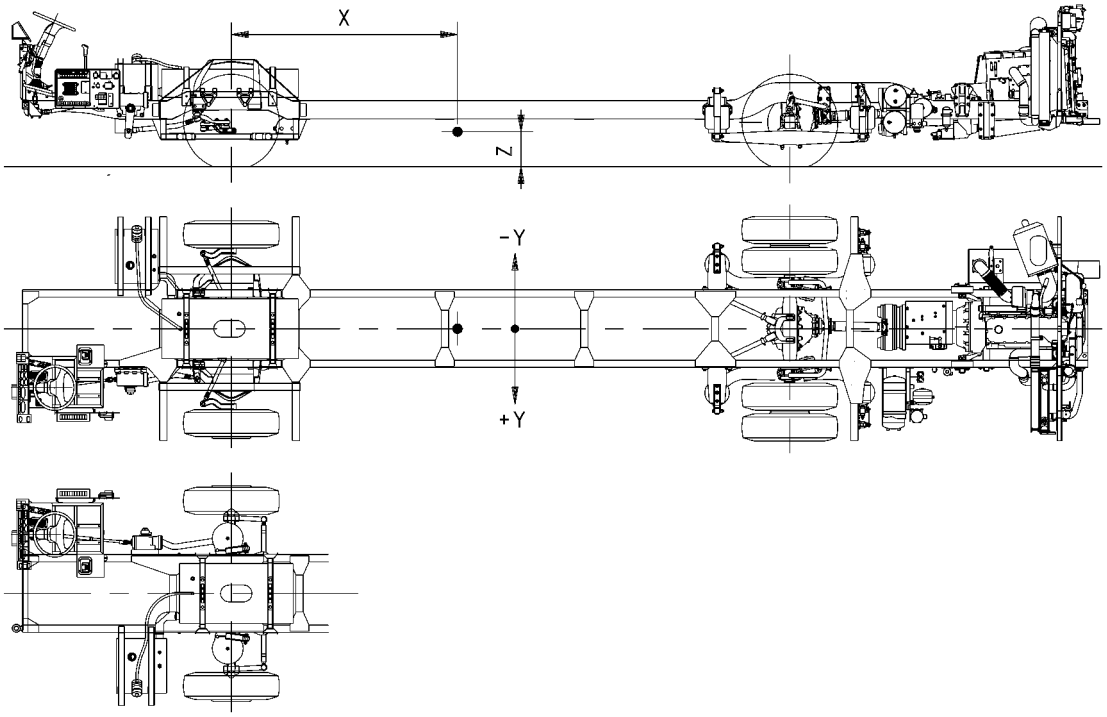
The chassis centre of gravity is shown in the following table for calculating centre of gravity in vehicles with body for type-approval according to Regulation 66/ECE.

Dimension X: Distance from front axle
Dimension Y: Distance from middle plane of the vehicle (+ right-hand side - left-hand side)
Dimension Z: Distance from ground

Data refer to the conditions illustrated in paragraphs 2.3.1 and 2.3.2, with standard tyres.

Type	X	Y	Z
397E.12.31/35-ER	5090	0	540
397E.12.31/35A-ER	5130	0	540
397E.12.31/35-SRI	5090	0	540
397E.12.31/35A-SRI	5130	0	540

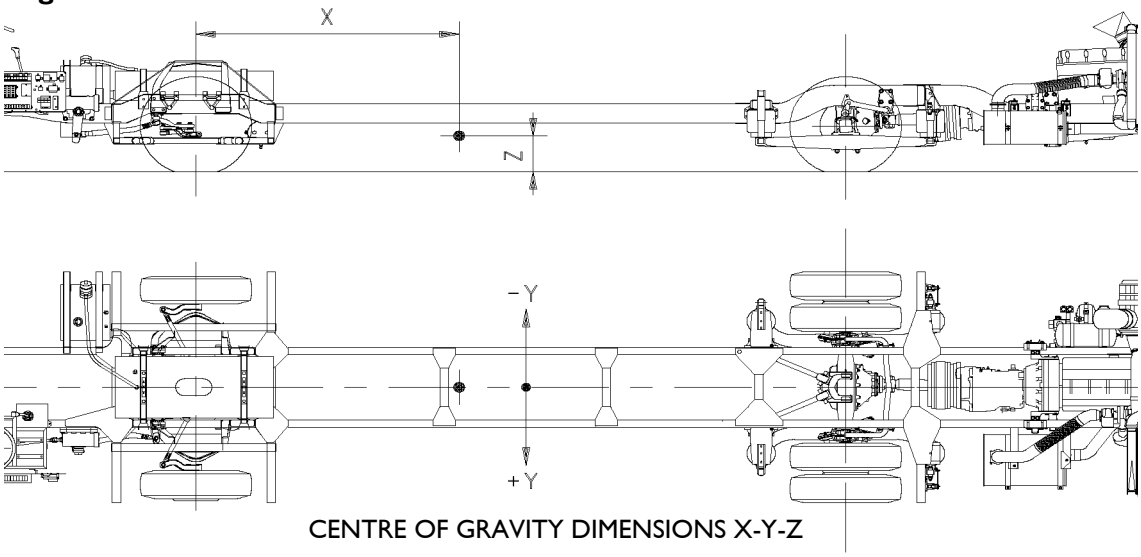
Figure 2.3



CENTRE OF GRAVITY DIMENSIONS X-Y-Z

Type	X	Y	Z
397E.12.43-ER	5090	0	540
397E.12.43A-ER	5130	0	540
397E.12.43-SRI	5090	0	540
397E.12.43A-SRI	5130	0	540

Figure 2.4



CENTRE OF GRAVITY DIMENSIONS X-Y-Z

2.4.4 Assembly measurements

Assembly measurement plan ratio for each vehicle type.

Type - BOGIE	Ref. IRISBUS	Type - STANDARD	Ref. IRISBUS
397E.12.35 ER	504050969 DL	397E.12.31/35 ER	504050971 DL
397E.12.35A-ER	504050970 DL	397E.12.31/35A-ER	504050972 DL
397E.12.31 ER (DX)	5006302622 DL	397E.12.35 ER (DX)	504050973 DL
397E.12.31A-ER (DX)	5006302623 DL	397E.12.35A-ER (DX)	504050974 DL
397E.12.31/35 SRI	504048615 DL		
397E.12.31/35A-SRI	504050954 DL		

Type	IVECO reference plan
397E.12.43 ER	504035699 DL
397E.12.43A-ER	504051045 DL
397E.12.43 SRI	504035700 DL
397E.12.43A-SRI	504051046 DL

Both the wheelbase and the rear projection of the vehicle with body may modify the assembly measurement plans to a certain extent to ensure the best adaptation of the body to the chassis.

2.5 FASTENING OF BODY TO CHASSIS

2.5.1 General chassis modification rules

The interventions admitted on chassis by IRISBUS are illustrated in the corresponding paragraphs.

In addition to the admitted interventions (expressly stated in this standard), all other changes must be subjected to prior written authorisation by IRISBUS Bus Quality Department.

Modifications to the braking and steering systems are forbidden.

Outfitters shall present documentation illustrating the rationale of the modification project for approval to IRISBUS including the following:

- List of all removed parts.
- List of modified and/or added parts specifying quantity.
- Modified and/or added part plans, specifying: shape, dimensions, tolerances, material, thermal treatment, surface protection, reference to standards or other specifications to be respected.
- Assembly drawing with assembly position of all parts.
- Descriptive report including size calculations and test results.

2.5.2 Preliminary body assembly operations

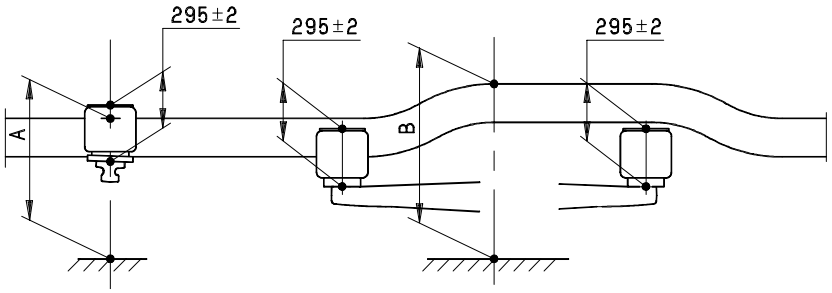
Removed chassis parts shall be suitably removed, protected and identified.

The chassis must be levelled on flat ground before connecting to the body frame. Relieve engine weight to ensure torsion and flexion less than 3 mm.

Figures 2.5 and 2.6 show the front and rear axle levelling dimensions and the torsion tolerance of the side-member.

The chassis must remain in this position until the welding process is completed.

Figure 2.5 (with unsprung axle)

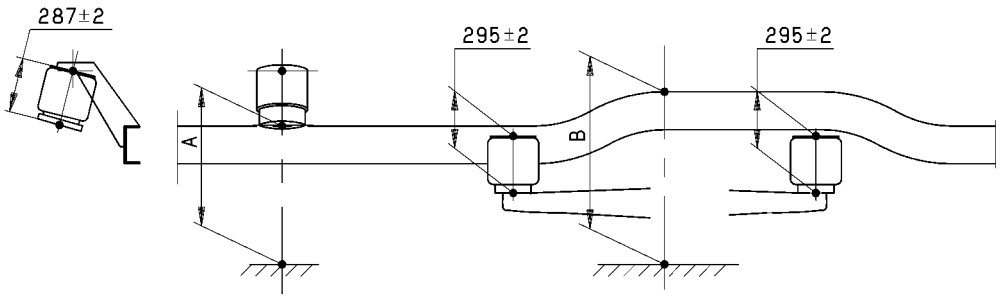


LEVELLING DIMENSIONS UNDER STATIC LOAD

*NOTE: Static load values
Vehicle levelled with "diapresses" at 295 ± 2; the vehicle tare will be higher because the radius under load of the tyre is higher in lack of static load weight.

	Front axle (A)	Rear axle (B)
305/70 R-22.5"	700	900
295/80 R-22,5"	726	926

Figure 2.6 (independent wheel suspensions)



LEVELLING DIMENSIONS UNDER STATIC LOAD

*NOTE: Static load values
Vehicle levelled with "diapresses" from 287 ± 2 to 295 ± 2; the vehicle tare will be higher because the radius under load of the tyre is higher in lack of static load weight.

	Front axle (A)	Rear axle (B)
305/70 R-22.5"	700	900
295/80 R-22,5"	726	926

Pay special attention to the union of chassis parts to the body sides. Particular care is required for these joints to ensure perfect stress transmission.

Front and rear part joints to wheelhouses are particularly critical because stress is transferred to the rest of the structure main through these elements.

Avoid the punctual application of high pressure generating forces in the body joint points.

The body structure must be designed to form a load-bearing unit with the chassis. Flexural, torsion and thrust stress must be absorbed by the whole structure.

This arrangement is necessary to ensure relative flexibility of the chassis.

Contact IRISBUS Bus Quality Department in the event of doubts.

The body shall be fastened to the structure by means of welding or threaded coupling. The use of mixed connections should be avoided.

Intermediate plates shall be used in all cases to fasten body parts.

2.5.3 Fastening of body to chassis by welding

Disconnect the following parts before starting welding operations:

- ECUs ABS, automatic transmission, Voith retarder (where provided).
- battery earth wire
- all connections to alternator and dashboard.
- Make sure that disconnected wires do not come into contact.

Protect the following parts from heat and welding, grinding and drilling spit:

- dashboard
- steering wheel
- electrical system
- polyamide lines
- air springs
- rubber tubes, etc.

Remove systems from welding and grinding areas, etc. if required and rearrange them when finished.

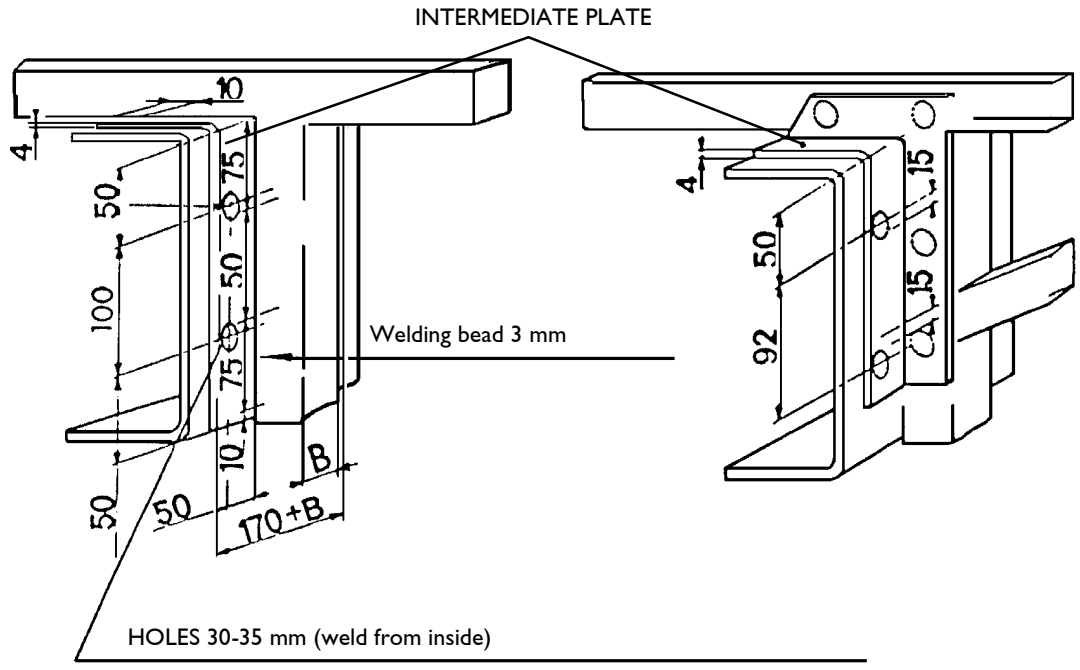
Connect welding machine earth as close to the welding area as possible. Never connect near a revolving part (transmission, hubs, etc.) nor over or under a component with moving parts (compressor, bearings, etc.).

Clean the areas to be welded before starting to ensure good penetration.

Chassis areas to be welded must be carefully cleaned and protected with zinc tetraoxychromate base or the like. Apply a second coat of bicomponent epoxy base plus red bicomponent polyurethane on the IRISBUS IC-105 chassis.

Figure 2.7 illustrates two examples of fastened by welding. Sizes are indicative.

Figure 2.7



2.5.4 Technical welding requirements

Weld beads on beams subjected to flexion must be as close as possible to neutral fibre and parallel to the direction of stress.

Avoid sudden changes in cross-sections and accumulation of beads.

The welded material must penetrate adequately into the bead vertex, without pores, grooves, drops, spits or chip inclusions.

Cooling of welded areas must not be accelerated in any way. Welding quality shall comply with CS/BK as per DIN 8563 - Part 3.

Figures 2.8 and 2.9 show the conditions of weld beads with longitudinal bead on side-members.

Figure 2.8

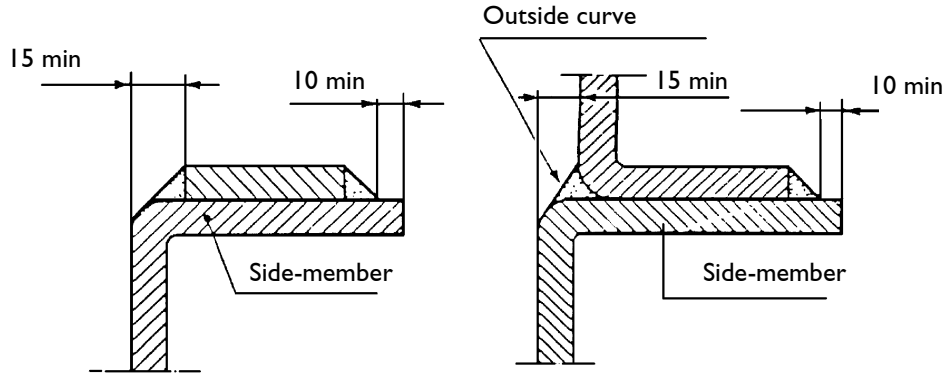


Figure 2.9

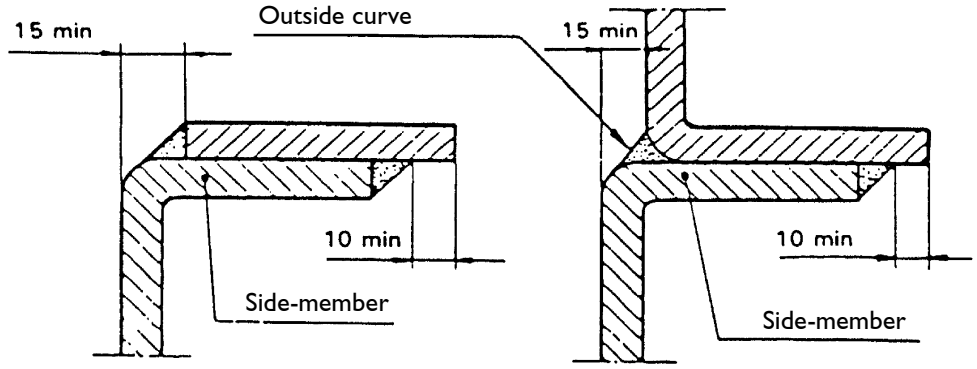


Figure 2.10 shows the arrangement of flat reinforcements welded to the side-member. Figures 2.11 and 2.12 show the recommended arrangement of cuts for a head-to-head side-member joint with L-reinforcements.

Figure 2.10

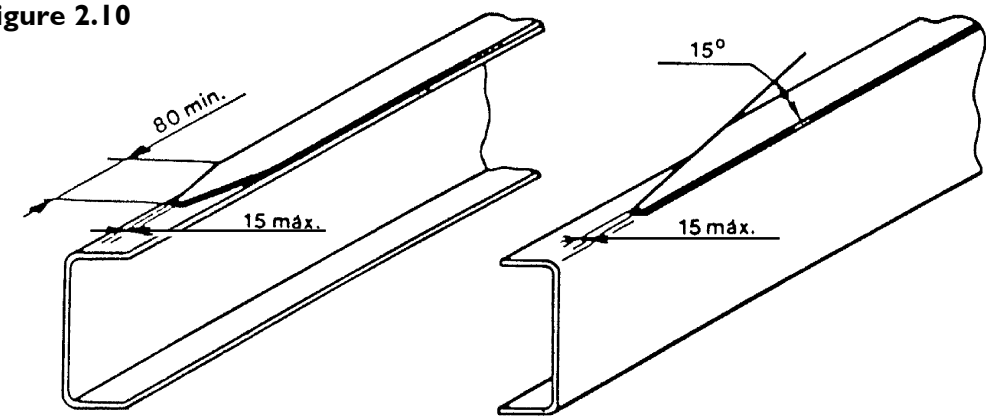


Figure 2.11

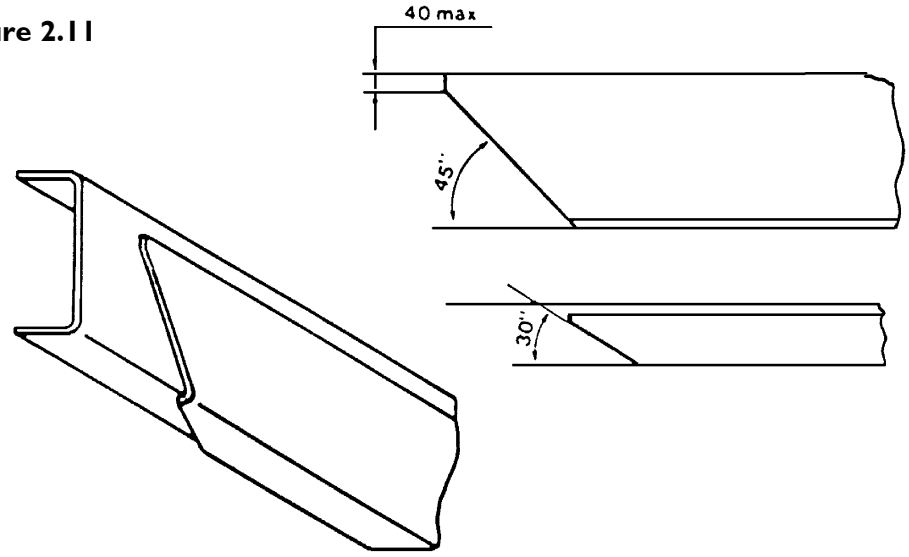
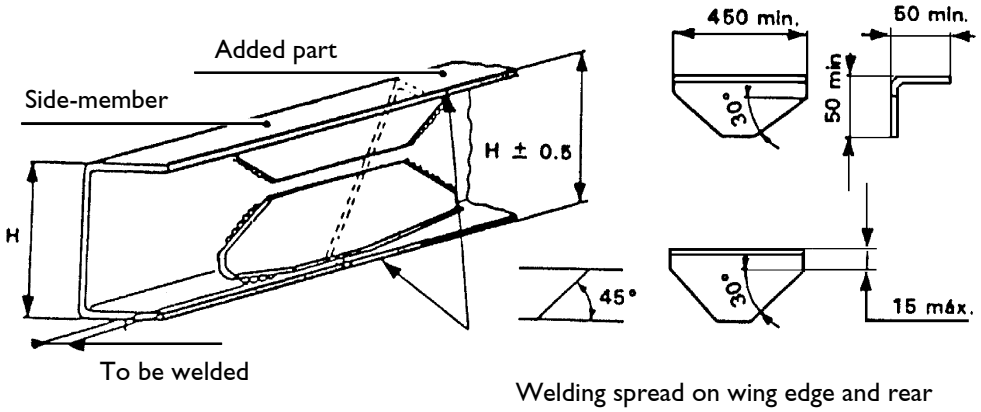


Figure 2.12



Welding spread on wing edge and rear longitudinal grinding to eliminate sharp edges.

2.5.5 Spot welding

Spot welding must ensure resistant connection between the parts. Sizing and distribution shall comply with the transmitted stress level.

Carefully clean the concerned areas before welding and apply a protective bicomponent epoxy base or the like and a top coat of mono- or bicomponent paint.

2.6 PERFORATING THE CHASSIS

Perforation of the chassis for fastening auxiliary units or components is allowed at the following conditions:

- Never perforate the side-member wings, shelves or cross-members.
- Do not perforate in the areas must subjected to stress, i.e. near the power steering mounts, suspensions and engine mounts.
- Do not perforate in the curved areas of the side-members.
- The minimum diameter of the drilled holes shall be equal to the thickness of the sheet; maximum diameter shall not exceed 15 mm.
- Minimum distance from centre of the hole on the external part of the side-member must be 40 mm.
- Minimum distance between centre of holes must be 50 mm.
- Do not drill more than two holes on a vertical line perpendicular to the axis of the side-member.
- After drilling, eliminate edges so that the parts to be fitted or the screw heads rest on a perfectly flat surface.

Drilling conditions are shown in figure 2.13.

Figure 2.13

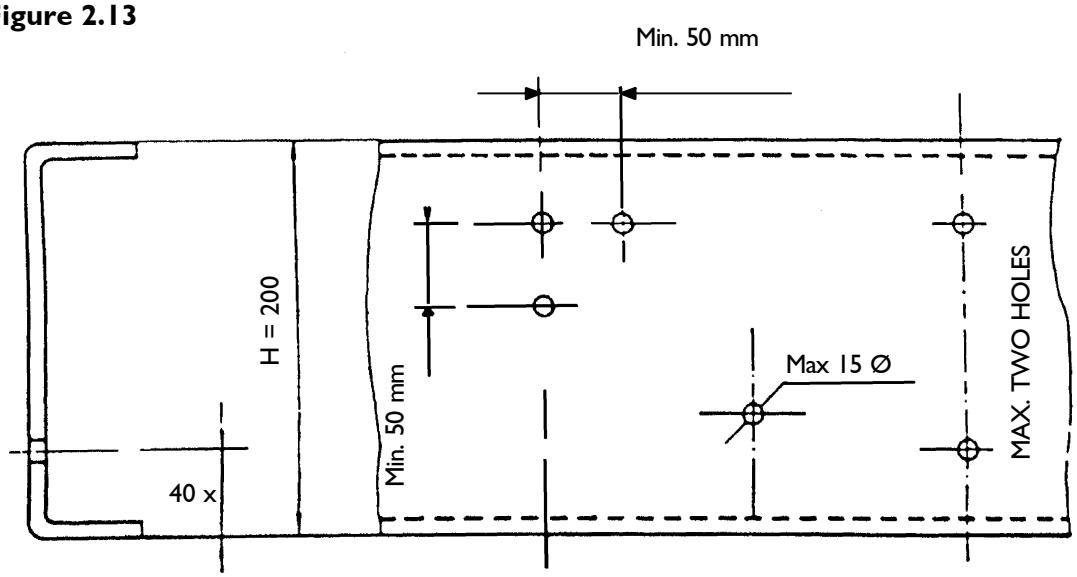
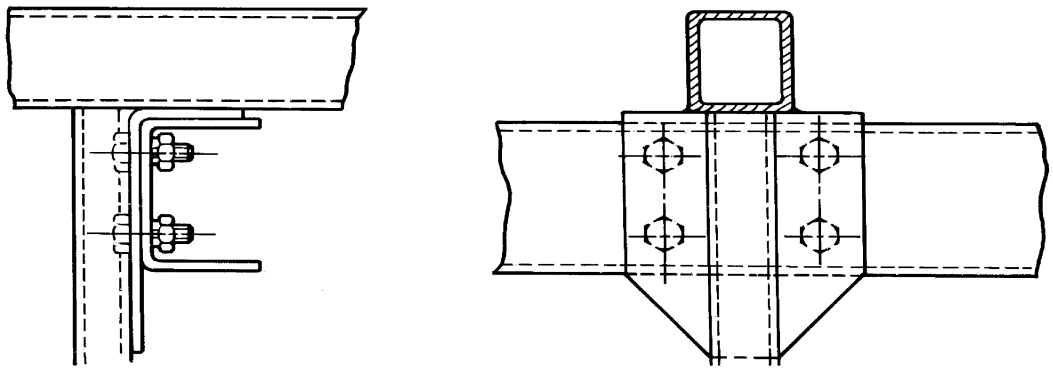


Figure 2.14 shows an example of threaded coupling of body to chassis.

Figure 2.14



2.7 BASIC BODY CONFIGURATION REQUIREMENTS

2.7.1 Wheelhouses

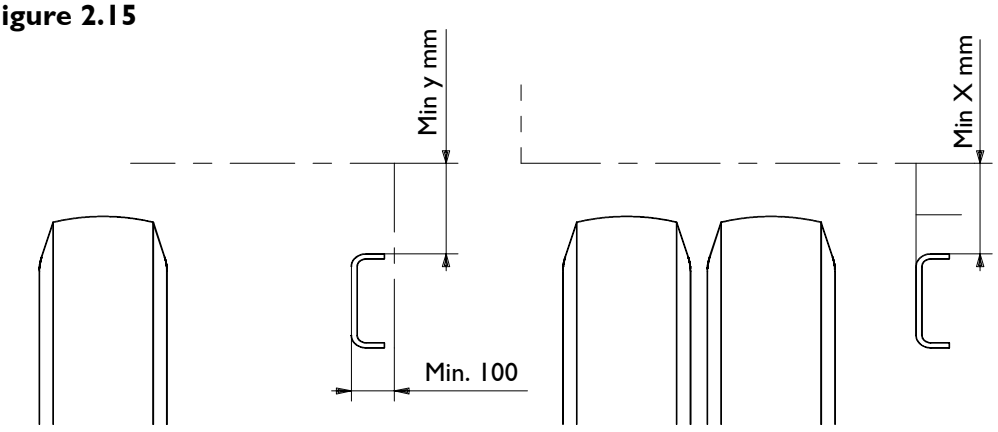
Wheelhouses will be at a minimum distance of 20 mm or 50 mm from the maximum stroke position of the wheel, according to the "System Measurements" plan, to avoid interference between wheels and wheelhouses and to ensure appropriate brake ventilation.

Type - BOGIE	Ref. IRISBUS	Type - STANDARD	Ref. IRISBUS
397E.12.35 ER	504050969 DL	397E.12.31/35 ER	504050971 DL
397E.12.35A-ER	504050970 DL	397E.12.31/35A-ER	504050972 DL
397E.12.31 ER (DX)	5006302622 DL	397E.12.35 ER (DX)	504050973 DL
397E.12.31A-ER (DX)	5006302623 DL	397E.12.35A-ER (DX)	504050974 DL
397E.12.31/35 SRI	504048615 DL		
397E.12.31/35A-SRI	504050954 DL		

Type	IVECO
397E.12.43 ER	504035699 DL
397E.12.43A-ER	504051045 DL
397E.12.43 SRI	504035700 DL
397E.12.43A-SRI	504051046 DL

Figure 2.15 shows the play between wheel and wheelbase to be respected.

Figure 2.15

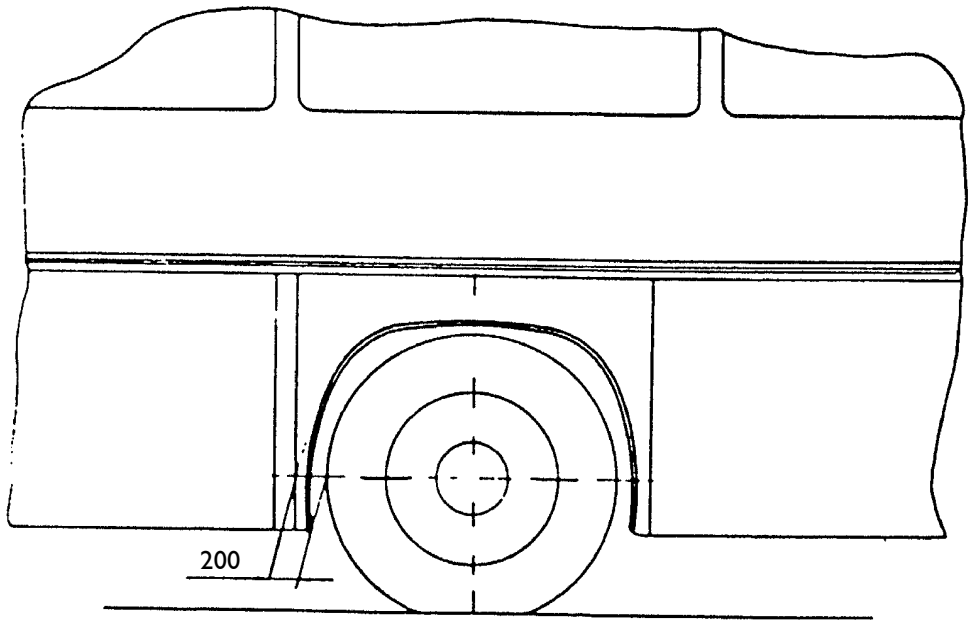


Front suspension Rear suspension

Dimension Y	Dimension X	Tyre
500	425	295/80
500	400	305/70

Wheelbases must be perfectly ventilated to avoid overheating of rear wheels. Adequate distance between wheelhouse and wheel shall be ensured (see figure 2.16).

Figure 2.16



The mentioned side must be accessible for air spring inspection and maintenance.

2.7.2 Protection of air springs

The body must be provided with a partition to protect the air springs separating them from the wheels and preventing damage from sand, mud or stones. The partition shall have a free diameter surrounding the spring of 350 mm and will be easily accessible for inspection and maintenance of air springs and other suspension system components.

2.7.3 Wheels and tyres

Contact surfaces must be clean and rust-free before fitting the wheels.

Rim and wheel bolt contact surfaces shall be protected if rims or brake drums need to be repainted.

Check wheel bolt tightness before delivery to the customer (if previously removed). See the "Instruction & Maintenance Manual" for correct tightening torque and procedure (see paragraph 2.18).

2.7.4 Wheel hub cap

The 397 range optionals include "front wheel hub cap" IVECO reference 93197151 and "rear wheel hub cap" IVECO reference 9319 7152.

The shape and size of the hub caps ensure effective wheel protection and correct brake ventilation.

Assembly of these parts is mandatory if wheel cups are fitted.

2.8 TECHNICAL VEHICLE SYSTEM REQUIREMENTS

2.8.1 Accessibility for maintenance

Body arrangement shall favour accessibility for inspections, maintenance, repairs or replacement of mechanical, pneumatic, hydraulic and electrical vehicle system components. Follow specifications in the "Maintenance" section of the "Instruction & Maintenance Manual" provided with the chassis.

Chassis system access flaps shall be provided for this purpose.

Si considerano due tipi di accessi:

Two types of access flaps are described here:

- internal servicing flaps
- external servicing flaps.

2.8.2 Internal servicing flaps

Flaps inside the vehicle shall provide access to the following systems:

- gear selector wire adjustment (not needed if optional ASTRONIC or automatic transmission is fitted)
- gear control lever and turret removal
- fuel gauge indicator
- front "Diapres"
- rear shock absorbers
- rear axle
- speed selector
- engine.

The arrangement of these flaps and their minimum dimensions are shown in the "System Measurement" plan:

Type - BOGIE	Ref. IRISBUS	Type - STANDARD	Ref. IRISBUS
397E.12.35-ER	504050969 DL	397E.12.31/35-ER	504050971 DL
397E.12.35A-ER	504050970 DL	397E.12.31/35A-ER	504050972 DL
397E.12.31-ER (DX)	5006302622 DL	397E.12.35-ER (DX)	504050973 DL
397E.12.31A-ER (DX)	5006302623 DL	397E.12.35A-ER (DX)	504050974 DL
397E.12.31/35-SRI	504048615 DL		
397E.12.31/35A-SRI	504050954 DL		

Type	IVECO
397E.12.43-ER	504035699 DL
397E.12.43A-ER	504051045 DL
397E.12.43-SRI	504035700 DL
397E.12.43A-SRI	504051046 DL

All the aforesaid flaps are required for low bed vehicles (approximately 800 mm from the ground). Some may not be required (providing correct access is ensured from the outside) if the internal body bed is higher.
Contact IRISBUS Bus Quality Department if in doubt.

2.8.3 External servicing flaps

Flaps on the side or rear of the vehicle shall provide access to the following systems:

- engine compartment (access from rear hood and side flaps)
- for maintenance of engine, air cleaner, coolant reservoir and power steering oil reservoir
- radiator and injection pump
- batteries
- front and rear air springs
- shock absorbers
- ECU
- windscreen wiper motor
- drive belt
- pneumatic circuit filling fitting
- power steering system
- brake control valve
- hydraulic clutch and brake fluid reservoirs
- HVAC devices
- defroster.

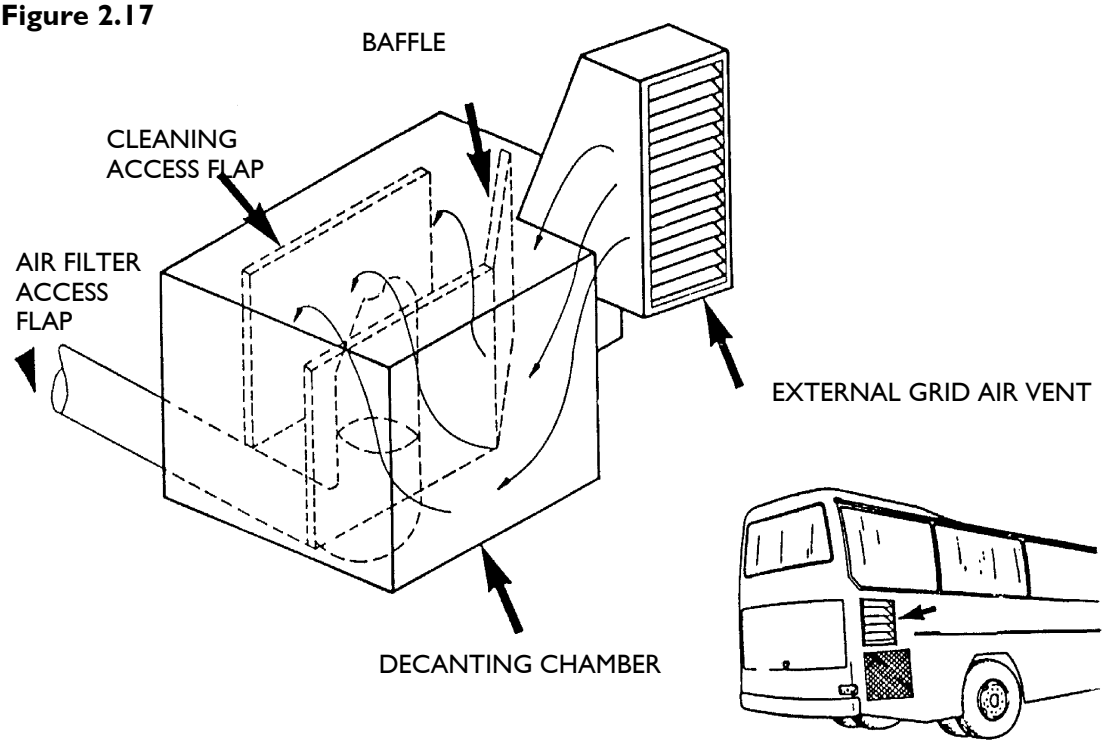
2.8.4 Engine air suction

The chassis is provided with air cleaner, cleaner lines to intercooler and from intercooler to engine. Respect the position of the cleaner. Consider cartridge replacement ease and possibility of reading the identification plate showing brand and type.
Pay special attention to the suction vent to avoid the entrance of water and dust.
For this purpose, the suction vent will consist of the following parts:

- Outer grid, formed by horizontal reeds to prevent entrance of water.
  Located by the side of the vehicle is the highest possible position.
  Minimum surface will be 300 cm^2.

- Decanting chamber, fitted between entrance grid and cleaner, to separate water and dust. The minimum cross-section of the line between chamber and grid will be 300 cm^2; the internal chamber passages must have the same cross-section. A 15 mm diameter hole will be provided in the bottom of the chamber for letting our separated water and dust. A pipe with a minimum cross-section equal to that of the cleaner inlet shall lead from chamber outlet to cleaner. Use a 30° tapered passage if changes in cross-sections of this pipe are required. Avoid elbows and cross-section changes. The cross-sections must be increased if this cannot be avoided to compensate the effect (see figure 2.17).

Figure 2.17



The total drop of pressure due to the grid, chamber and pipes must not exceed 350-400 mm water column measured at maximum power.
The internal walls of the chamber and the pipes must be painted. The inner chamber should be soundproofed to dampen suction noise.
The air cleaner cannot be replaced with a model of another brand and/or type unless specific written authorisation is provided by IRISBUS Bus Quality Department. Modifications to the piping are subjected to prior written authorisation by IRISBUS Bus Quality Department.
A modification project must be presented for approval as shown in paragraph 2.5.1 to obtain type-approval by IRISBUS Bus Engineering. Tests for ensuring correct engine operation may be conducted at the applicant's expense.

2.8.5 Steering

The steering box must be accessible for repairs, adjustments, bleeding and dumping oil. Therefore, the relay and fuse box must be arranged in a position to allow access or either be easily accessible. The power steering fluid reservoir must be accessible for filling, checking the level and replacing the filtering cartridge.
A minimum distance of 30 mm must be ensured between body parts and steering linkages in all steering positions, to the left and to the right, also considering the extreme suspension positions.
As indicated in paragraph 2.5.1, it is forbidden to work on any part which may modify the steering column stress or produce effects which infringe current laws on steering systems and/or devices for preventing unauthorised use of engine vehicles (anti-theft systems).

2.8.6 Exhaust

The exhaust pipe and the muffler must be adequately accessible to permit easy assembly and disassembly, in addition to easy checking of registration plates. Flaps shall be arranged, if required.

Correct engine operation is obtained when the exhaust pipe and muffler are incorporated in the chassis. Changing this arrangement means negatively affecting engine performance and the emission of gasses. Written authorisation by IRISBUS Bus Quality Department is required before modifying and/or replacing the exhaust pipe and/or the muffler with another brand or type.

All structural or panelling materials near hot spots must respect the requirements stated in paragraph 2.14.4 "Organic material requirements for fire prevention purposes".

Written authorisation by IRISBUS Bus Quality Department is required to modify the exhaust pipe. A modification project must be presented according to the procedure illustrated in paragraph 2.5.1, which states that exhaust counter-pressure exceeds 650 mm water column to obtain type-approval by IRISBUS Bus Engineering. Tests for ensuring correct engine operation may be conducted and the cost will be charged to the applicant.

2.8.7 Front hydraulic brake reservoir (rigid axle version only)

The reservoir is located in the front of the chassis, to the right of the steering wheel. A flap will be provided to ensure access for inspections and filling.

The position of the reservoir must be respected for correct operation of the brake system. Written authorisation by IRISBUS Bus Quality Department must be obtained to change the position. In the relocation project, the lower part of the reservoir must have a minimum height of 250 mm from the master cylinder; furthermore, the pipe radius must be sufficient to avoid choking and must lead upwards.

The master cylinder must be easily accessible for maintenance and repairs.

The fluid reservoir must not be emptied and the cylinder to reservoir pipe must not be disconnected during body fitting. They should be left in transportation position, if possible. The reservoir level must be kept adequately high to avoid letting air bubbles into the pipe. Bleed if there may be bubbles in the brake circuit.

Top up using TUTELA DOT 4 fluid only in the event of leakage. Do not mix with other fluids. Do not reuse fluid and do not use fluid which may have been contaminated by dirty containers. Disrespect of these instructions may affect the performance of the braking system.

2.8.8 Clutch reservoir

The reservoir is located in the front of the chassis, to the left of the steering wheel. A flap will be provided to ensure access for inspections and filling. The procedure above will apply for modifications. In this case, a height of 150 mm from the clutch master cylinder is required.

In modular versions, fill and bleed the circuit using TUTELA DOT 4 after fitting the chassis (see Service Manual).

2.8.9 Engine cooling

The radiator-intercooler assembly is arranged on the left of the engine. The body must incorporate a radiator suction compartment which in connected to the outside through a grid. The grid configuration must prevent penetration of dust and foreign bodies which may soil the wasp-nest structure. The grid size will be similar to that of the radiator with a minimum surface of 5000 cm^3. Particular attention will be devoted to the muffler arranged in the lower part in front of the radiator. The piping will be heat isolated to avoid increasing the radiator inlet air temperature.
The shape and size of the suction compartment must ensure unobstructed air flow from the grid to the wasp-nest structure without choking which could reduce capacity. Contact IVECO if in doubt and carry out cooling system capacity tests.

A flap for accessing the injection pump must be arranged on the fan suction compartment wall as close to the engine as possible. The dimensions of the flap are shown in the system measurement plan. The opening must allow access of a person and must be adequately sealed.

The suction compartment must be airtight and equipped with rubber seals to prevent recirculation of hot air. Seal quality shall be sufficient to withstand a constant temperature of 100°C with short periods at 120°C without appreciable deformation or deterioration. The compartment cross-section must be suitable for the passage of air along the entire course.

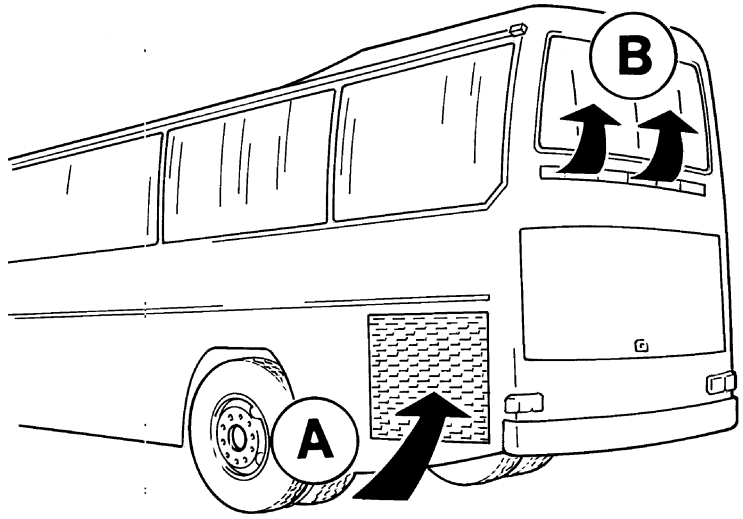
Hot air will be let out through a grid located in the highest part of the engine compartment. Minimum compartment size will be 2.000 cm^2.

Installation of internal heating systems or line modifications must not effect efficacy of the cooling system. In this case, check operation of cooling system in terms of filling, bleeding and air circulation as follows:

- Open heating system feed taps and heater breathers.
- Fill circuit with engine stopped at a constant flow of 8-10 litres/minute until the fluid flows out from the filler, close the heater breathers after bleeding the air.
- Start the engine and idle it for 5 minutes; the coolant level in the feeding reservoir must not be under the minimum level after this time.
- Accelerate gradually checking that the pressure in coolant pump outlet pipe increases gradually without jerking.
- Keep the engine accelerated until the thermostat opens; check the passage of air bubbles through transparent tubes located between:
  . engine and radiator outlet
  . filler reservoir and coolant pump
  . engine air bleeder and filler reservoir.
- No more bubbles should appear in the circuit 15 minutes after the thermostat has opened.
- With the thermostat open and the engine idling, the pressure measured at the coolant pump outlet pipe must exceed 500 mm water column.

Figure 2.18 shows the relative position of cooling air inlet and outlet in the rear part of the body.

Figure 2.18



A Air inlet
B Air outlet

2.8.10 Movement of units and fastening of supplementary equipment

Units (such as fuel tanks, batteries, spare wheel, etc.) may be moved when the structure so requires providing the new arrangement does not affect functionality, the original connections are employed, the new mounts permit connecting or resting the unit in the same previously used points and the distribution of weight is compatible with vehicle specifications.

The instructions in paragraph 2.5.4 "Technical welding requirements" and 2.6 "Perforating the chassis" shall be respected for fitting supplementary equipment (such as reservoirs, compressors, and AC air condensers, etc., including spare wheel and batteries when required).

Projecting fastening of heavy components (e.g. batteries) is not allowed. Mounts must rest on the side-members and be fastened to other elements, such as shelves or one of the sides.

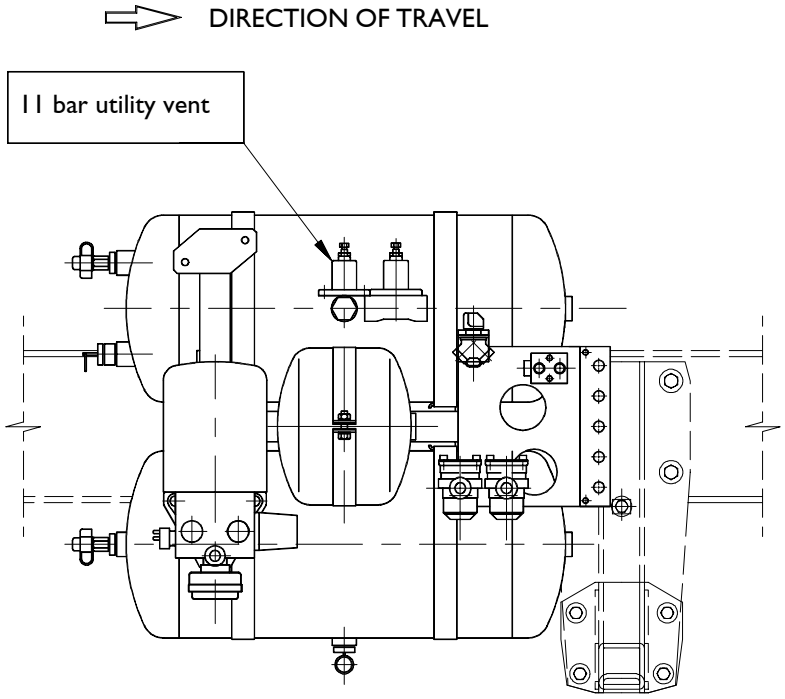
The spare wheel mount must allow easy extraction and respect a minimum entrance angle of 7° or higher according to the envisaged service of the vehicle.

2.8.11 Utility air vents

Air will be taken through the vent on the auxiliary utility reservoirs located in the rear part of the chassis on the left side-member and never from the brake reservoirs.

Figure 2.19 shows the position of the valve and reservoir.

Figure 2.19



2.8.12 Electrical system precautions

Protect the electrical system from heat and spits when welding nearby. If required, untie harnesses remove the system from the welding area and tie again when the operation is over.

Disconnect the electrical system when carrying out electrical welding.

Harnesses and wires must be protected with grommets where the system crosses body panels. Do not fasten wires or other electrical components to the fuel lines.

The temperature must not exceed 80°C in paint drying oven.
Electrical connections must be protected during painting to avoid causing faulty contacts.

Do not exceed the maximum permitted intensity in connections.

Each circuit must be protected by a suitable fuse in the body system. Wires and harnesses must be correctly protected and dimensioned according to Regulation 36/ECE and/or other regulations in force where the vehicle will either be registered and/or travel.

The central safety control system must work in the specified way according to the various applicable standards.

2.8.12.1 ECUs

Disconnect the batteries before handling the electrical systems or electrical and electronic components to avoid causing failures to system programming.

Check that all electrical and electronic covers are correctly connected to avoid possible damage to the system programming.

Especially insist on tachometer lines.

2.8.13 Precautions for welding, grinding and painting mechanical components during body fitting

- Disconnect the positive and negative (24V) battery terminals and connect by means of a screw and nut before starting electrical welding operations.
  Similarly, disconnect ECUs fitted aboard before welding.
  Do not forget to disconnect the ECUs built into the engine EECU and the ASTRONIC transmission (where fitted).
- Protect all concerned components from heat and welding; grinding and drilling spits, such as: dashboard, steering wheel, polyamide piping, rubber tubes, air springs, electrical connectors, etc.
- Never paint the following: suspension rubber membranes and air spring metal pistons; brake disks and callipers; shaft with CV joint (between steering box and power steering unit); heat exchange surface (radiator panels and air serpentine tubes); radiator fan, hub and vanes.

Mechanical chassis parts which are already protected, electrical component housing, pneumatic and hydraulic system valves, control cable terminals and component identification plates should not be painted. Use red IRISBUS 41589 paint for touching up the engine (excluding the exhaust pipe catalyser) if required.

Do not paint the wheel rims, unless expressly required by the customer. Never paint the rim surface in the bolt area.

2.8.14 Alternator cooling

A suction vent will be made in the radiator air suction compartment or in other location to ensure suction of outside air to ensure a flow of fresh air to the alternator. Fitting of a grid with a minimum cross-section of 40 cm^2 is recommended on the air vent. The grid should be sufficiently fine to prevent the passage of foreign bodies into the alternator. A suitable air cleaner may be fitted on the end of the suction tube.

Air tube 9943 8818 provided to outfitters shall be employed. Figures 2.20 and 2.21 show the arrangement of the alternator cooling tube.

Figure 2.20 (for types 397E.12.31/35)

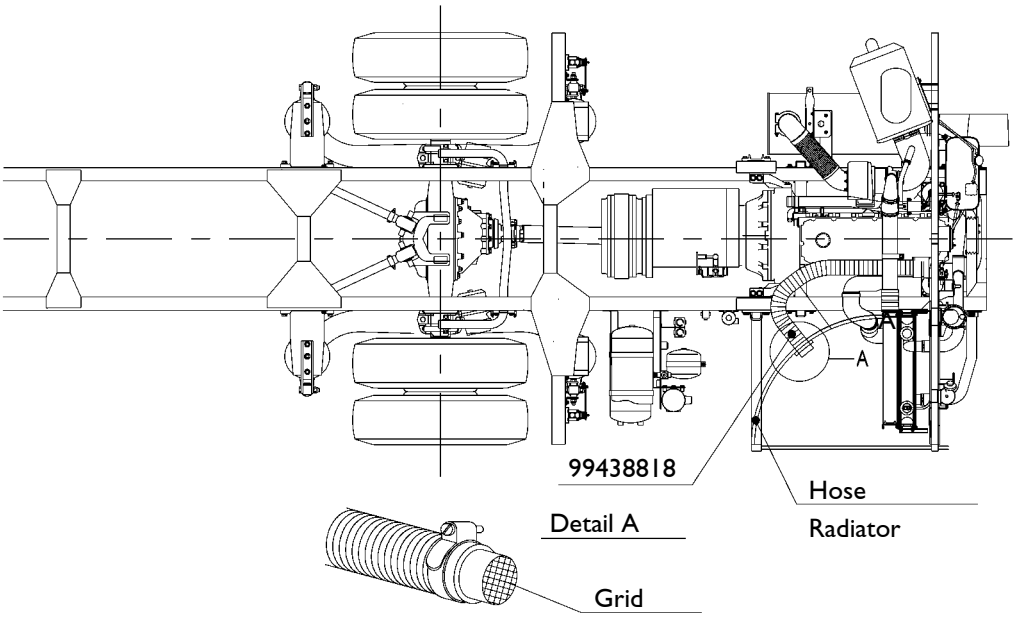
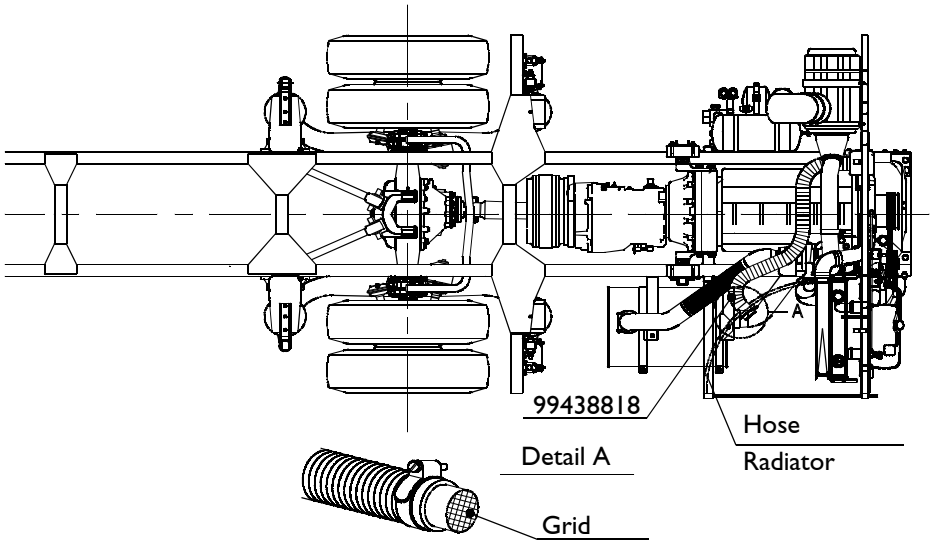


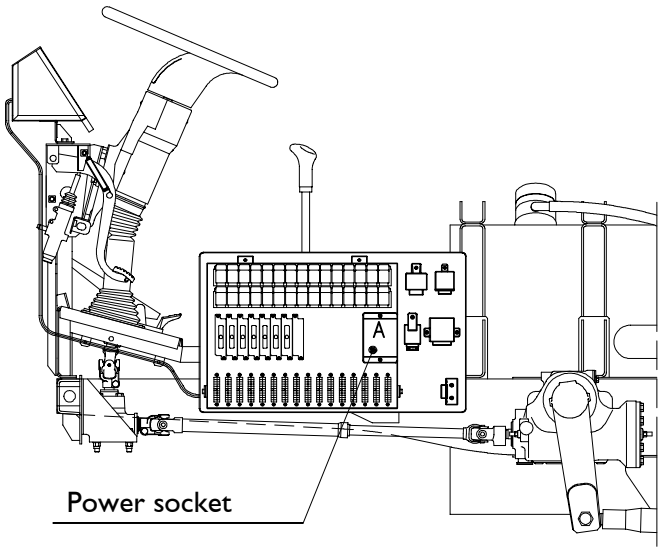
Figure 2.21 (for type 397E.12.43)



2.8.15 Electrical system confluence

Do not tamper with the basic electrical system (chassis, instrument panel, relay and fuse box). Connections for body utilities, with the exception of those defined in the basic system, must be carried out via a special body panel with relays, fuses and other components.
If permitted by the other elements, connections will be made using male-female terminals suited to the intensity of the circuit, i.e. using one or multiple pin connectors.
Power socket or sockets up to a maximum total of 1200 W may be made using china terminals fitted in the fusebox and connections. Tighten the nuts at a torque in the range from 3 to 4 Nm. The terminal is indicated by the letter "A" in figure 2.22.

Figure 2.22



Additional power may be taken directly from the battery disconnect if required and never directly from the battery terminals.

Types 397E.12.31/35:
The chassis is equipped with a set of two 90 A alternators. The maximum installed power of all components will be 3600 W. The maximum installed power must not exceed 3300 W if the vehicle fits an electrical brake.

An optional kit consisting of one 140 A alternator and one 80 A alternator is provided (instead of two 90 A alternators).
The maximum permitted total power with the two alternators (140 A + 80 A) is 4600 W. The total installed power must not be less than 4300 W of the vehicle fits an electrical brake.

For type 397E.12.43
The chassis is equipped with a 140 A alternator. The maximum installed power of all components will be 2700 W. The maximum installed power must not exceed 2400 W if the vehicle fits an electrical brake.

A second optional 80 A alternator may be provided. The total admitted power of the two alternators must be 4400 W or 4700 W, according to whether an electrical brake is fitted or not.

For all types, fitted of a second 80 A alternator (operated by the AC compressor) is recommended if additional power is required. In this case, the second alternator system will be an integral part of the body; the second alternator (made by Bosch) will ensure regular and compatible operation.

Direct connection to the terminals of one of the batteries if not allowed if the electrical system requires 12 V power. Fit an adequately dimensioned 24/12 V transformer.

2.8.15.1 Electrical panel

The relay, fuse and connection box shall be fitted to be tipped on hinges for maintenance and repairs.

Operations on the relay and fuse box is not permitted without the written approval by Irisbus Spanish Quality Department, SL.

The electrical panel includes the body utility connector fastened to the chassis system with the functions shown in the figures on pages 2-53 and 2.54.

Apply in writing to Quality Department if additional connections not specified in the figures are required. Inclusion will be provided by the Department.
Dot not tamper with the chassis electrical system to obtained the required signals.

2.8.15.2 ECUs

Fit the ECUs with supporting plate on the left side-member in direction of travel in a cabinet in an area near the front axle with internal conditions as indicated below, for types 397E.12.31/35:
Temperature range: -40°C to +70°C
Acceleration: ± 2g
397E.12.43 model for display. (Afficheur)

ECU interconnection wiring must not be modified.

2.8.15.3 CAN line assembly

The CAN line is a data transmission system connecting all ECUs aboard the vehicle, including the engine, for type 397.12.43 including the dashboard (Afficheur) and the tacograph.

The system differs from all others being characterised by a different coloured protective sheath. The cable is formed by three twisted wires with a certain number of turns per metre. The cable must remain separate from all other systems (minimum distance 10 cm).

2.8.15.4 Safety

Limit switches temporarily located in the engine compartment must be definitively fitted so that their status changes when the rear flap is opened.

This to avoid engine starting from driver seat when the bonnet is open.

Do not tamper with fixed chassis electrical systems (by connecting, deviating, cutting or lengthening) to avoid problems of hold, electrical overload of circuits or possible mechanical degrading of the harness and wire protections.

2.8.16 Heating system coolant confluence

When the source of heat is the engine only, the system will be made using a tube connected to the engine coolant outlet mouth if the vehicle fits a mechanical transmission. Otherwise, if automatic transmission or hydraulic brake is fitted, the connection will be made to the union which includes the engine water outlet tube to transmission or hydraulic brake (see detail in figures 2.23 and 2.24).

A thermostat to ensure correct engine running temperature will be fitted at water outlet.

The thermostat must be fitted between the circuit tap and the water outlet at a distance which does not exceed 500 mm from the outlet.

The following parts will be provided to outfitters for this purpose:

500 350576	Thermostat assembly	Quantity 1
98 463950	Tube	Quantity 1
177 64792 EY 4543	Clip	Quantity 2

Replace the engine cover heater water outlet with fitting 98475758 provided to outfitters in 397E.12.31/35 models (see figure 2.23).

Connect the heater water return union to the engine circuit to the existing point on the engine radiator return line in 397E.12.43 models (see figure 2.24). Fit 1"1/4 taps to inlet and outlet to cut off the heater circuit. The minimum diameter of the heater tube will be 32 mm.

Figure 2.23 (for types 397E.12.31 and 397E.12.35)

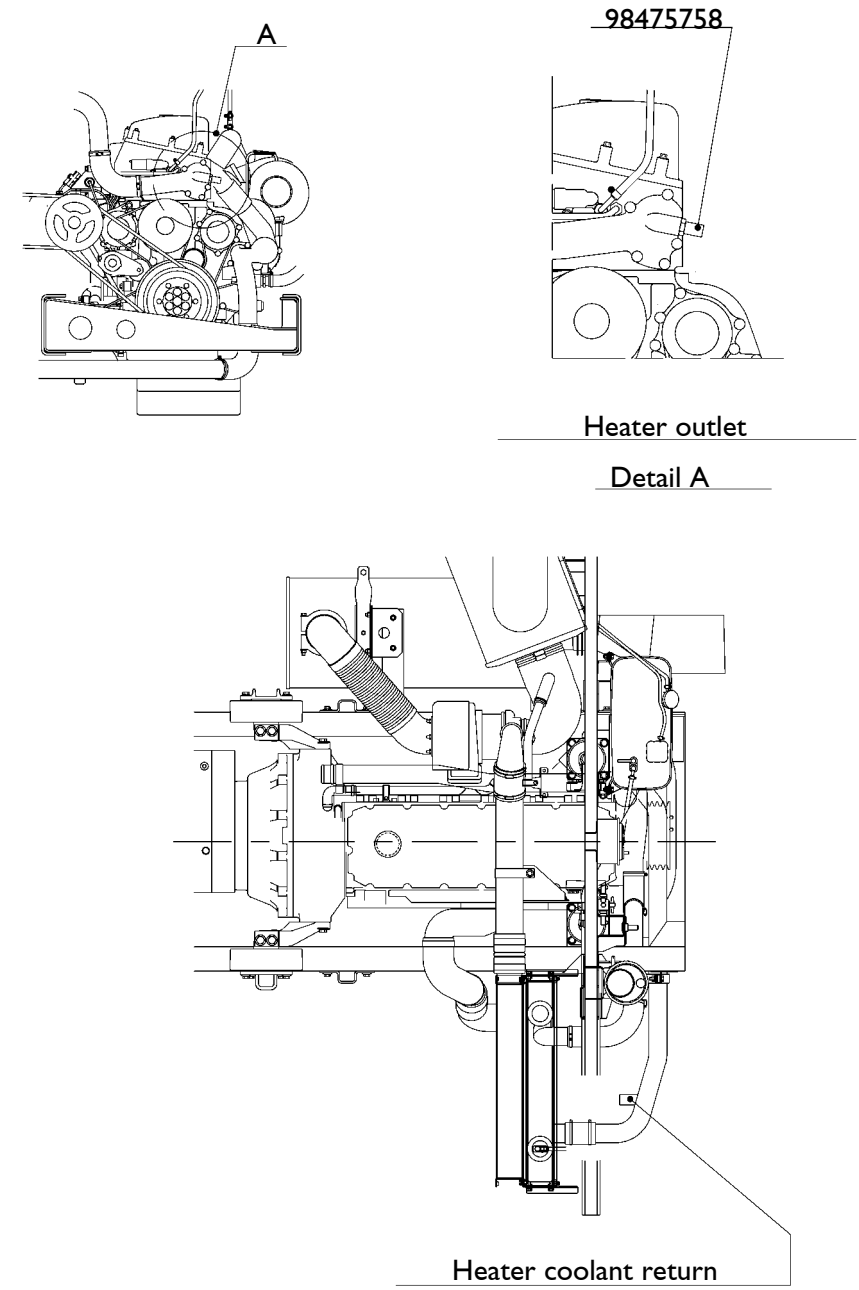
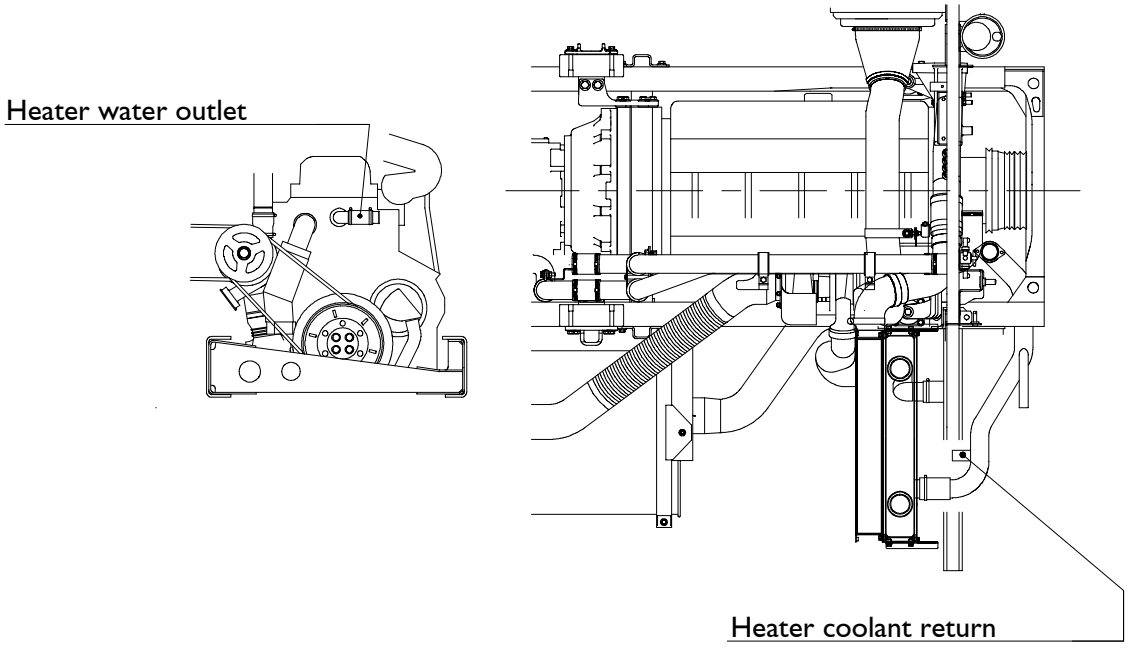


Figure 2.24 (for type 397E.12.43)



2.8.17 AC system assembly requirements

The crankshaft exhaust pulley has two free grooves for operating the AC compressor. Avoid excessive belt tightness to prevent damaging to the crankshaft collar joint. Tightness must not exceed 25 kg per belt.

The compressor will be fitted in the rear projection for operating requirements. The condenser and the evaporators will be fitted to permit adequate distribution of loads according to vehicle limits.

The air cooling system will respect the environment protection specifications and avoid ozone depletion, i.e. systems whose emission contain CFC will not be permitted.

Body configuration will permit easy access for maintenance and repair of the compressor. Drive belts shall not touch body parts and will be accessible without removing the fenders or other components.

2.8.18 Body identification plates and labels

In accordance with the current laws in force, the final product (vehicle with body) shall include at least the following identification plates and/or labels:

- chassis manufacturer identification plate (provided by IRISBUS);
- plate or label indicating the maximum vehicle speed, according to European Union Directive on ”Safety brakes” (recommended position: middle top of windscreen); ref. IRISBUS 4100 4446, provided;
- safety brake plate or label, mandatory by Spanish Law (recommended position: middle top of windscreen near label above); ref. IVECO 9945 8842 and 504043699, provided;

- body manufacturer identification plate (to be fitted by outfitter);
- vehicle dimensions plate according to Directive 83/364/EEC (to be fitted by outfitter).

2.8.19 Other

The following parts and systems will be considered:

- Horn: the vehicle with body must satisfy the minimum sound limit emissions according to corresponding laws.
- No part which may alter operation of the safety brake system (mandatory according to laws in force) may be modified.
- It is forbidden to tamper with braking system components and/or replace parts (valves, reservoirs, etc.) in braking system of vehicles with ABS (in accordance with paragraph 2.5.1) as to prevent affecting the original quality of the chassis with respect to laws in force. Furthermore, note that compressed air reservoirs are type-approved according to specific standards.
- Vehicle fuel tanks and respective seals, caps and other parts are type-approved. Modifying any part will require new type-approval at the outfitter's expense.

2.9 BODY CONSTRUCTION

2.10 INTRODUCTION

This section provides technical instructions and major standard references for constructing the body. The body will be defined by the outfitter according to the required specifications.

2.11 BODY CONFIGURATION

2.11.1 Main dimensions

Entrance and exit angles: equal to or higher than 7° for all vehicles.

Inner and outer steering circles: body construction shall permit steering circles in accordance with Regulation 36/ECE or equivalent applicable in the country where the vehicle is either registered or circulates.

Mud flaps: vehicles will be equipped with mud flaps behind each wheel to a height of 75 mm from the ground.

Body configuration will allow access to the vehicle identification number arranged on the front of the right-hand side-member (see paragraph 2.3.1).

2.12 INTERNAL CONFIGURATION AND VEHICLE CAPACITY

The surface available for passengers and the number of seats for all classes of vehicles (I, II III) will comply with Regulation 36/ECE or standards of the country of destination of the vehicle.

2.13 CHARACTERISTICS OF THE DRIVER'S SEAT

Heating: suitable hot air vents will be arranged to demist the windscreen.

Sun visor: the driver's seat must be protected by a sun visor whose height can be adjusted while driving and can be folded. The visor may consist of a rolling blind curtain or either partially or fully coloured glass.

Driver's seat: height adjustable, fore/aft adjustable with respect to steering wheel. Each setting will be independent. The seat will be provided with suitable suspension system and covered with transpiring material.

Driver's seat ergonomics: the dashboard equipped with the chassis may be either fitted in the front unit or in a custom made unit. In the latter case, it is advisable to be maintain the relative position of instruments and commands to ensure optimal ergonomics. Furthermore, the dashboard provided ensures direct correspondence of "indicators, controls and warning lights". This aspect must be verified following modifications. New type-approval may be required.

The dashboard must be arranged at an angle of 30° to 35° with respect to the vertical to ensure optimal operation of the retarder lever arranged on the right of the steering wheel as shown in figure 2.25 and 2.26. Outfitters will check that the clutch pedal stroke is not hindered by upholstery.

Figure 2.25 (for types: 397E.12.31 and 397E.12.35)

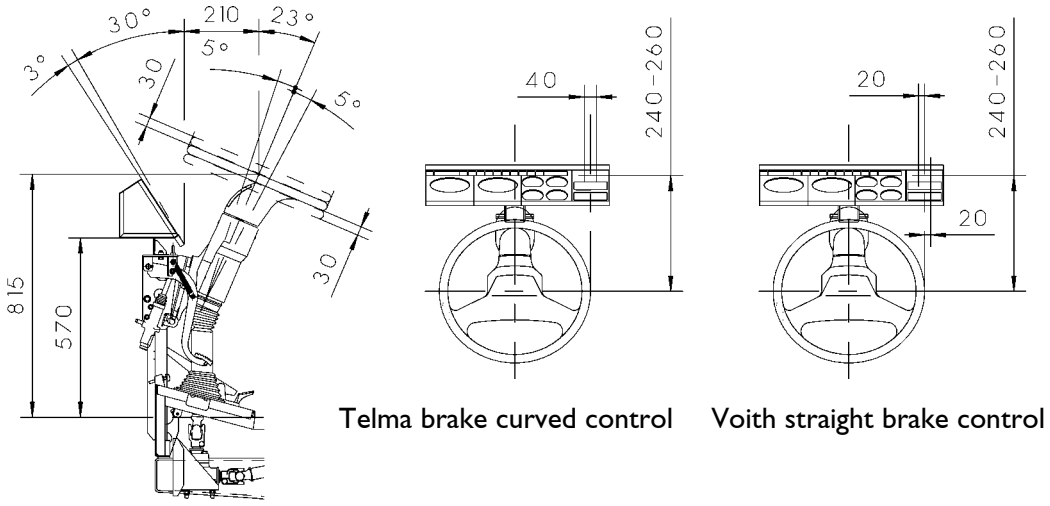
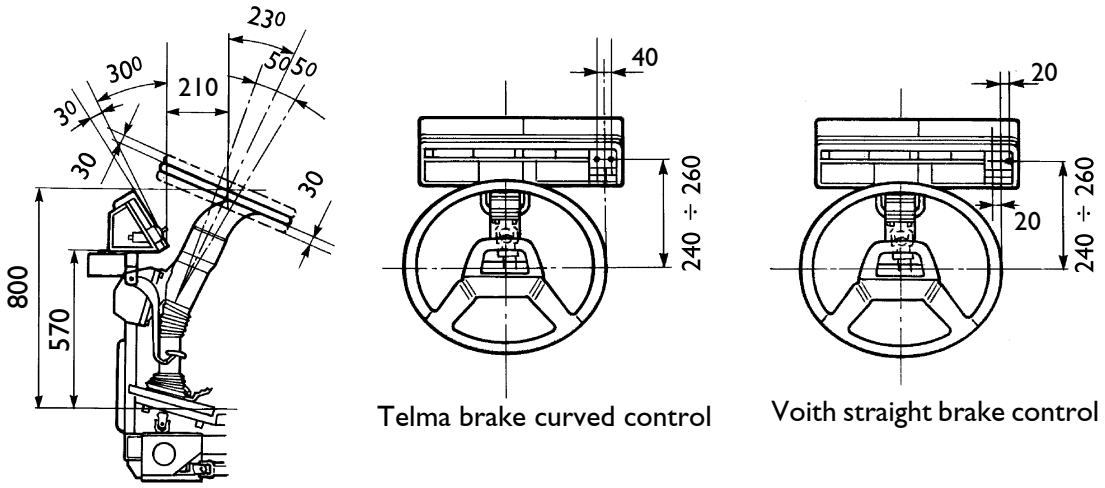


Figure 2.26 (for type: 397E.12.43)



2.13.1 Display assembly (397E.12.43 model only)

The display is an electronic device which presents the vehicle operating conditions to the driver.

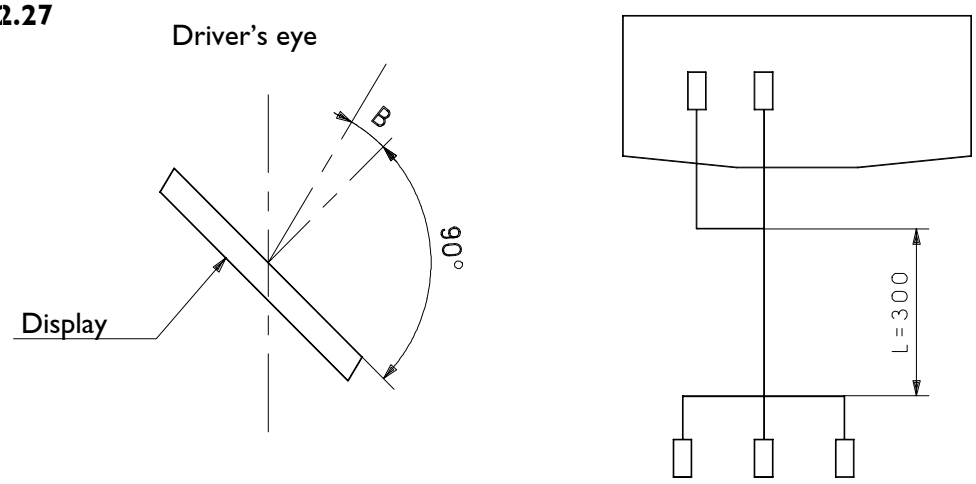
This device is fitted on a mobile stand and may be subjected to the following maximum temperature and conditions:
Temperature range: from -40° to +70°C; acceleration: ± 2g.

Display electrical wiring must be physically connected at a distance not exceeding 200 m from the two connectors on the back of the device. The connectors on the back of the device must not be disconnected for removal/refitting the display. The three interconnection wiring harnesses arranged at approximately 300 mm from the display must be used instead.

Angle B (formed by the display perpendicular line and the drivers viewing line) will be in the range from 0° to 30° to ensure correct viewing to read the information on the display.

Reading will be best if the value of B is as close to zero as possible (see figure 2.27).

Figura 2.27



2.14 RESISTANT STRUCTURE MATERIAL

Materials used to construct the resistant structure must be comprised in the tables of materials listed in chapter 4. Different materials must provide comparable mechanical characteristics.

The use of Fe 430 C (or equivalent) sheets or sections is recommended to ensure a good weight-resistance ratio.

Type-approval as per Regulation 66/ECE is required in Spain for all currently registered passenger transportation vehicles (classes II and III). The side structure must be designed, calculated and constructed to meet these requirements.

2.14.1 Resistant structure tubes

Preferably made of Fe 430 C (see materials table, chapter 4).

Resistant tubes shall meet flattening test requirements according to DIN 50136 Standard.

Maximum section torsion is 0.5° per metre of length.

Maximum section flexibility with respect to a straight line must be 0.25% of the length.

Corner outer rounding radius must be less than double the thickness of the wall; the inner radius must be equal to the thickness of the wall.

The inner radius must uniformly correspond to the outer radius without squeezing or formation of wrinkles.

The surface must be rust-free.

Welding beads must be lowered on the outer surface but still visible.

Conditions of the outer surface must permit spot welding with normal weld guns.

2.14.2 Body panelling

Galvanised matte sheet without star STE-280 3Z 200-SC-CHROMAT as per DIN 17162-2 Standard.

The same material will be used for drawing of pull boxes for wheels, brackets, etc.

Either stainless steel or composite material may be used for wheel pull boxes.

2.14.3 Riveting technical requirements

Rivets used to fasten the outer body panelling will be waterproof to avoid penetration of water inside. Waterproof tests are recommended when in doubt. Position hole in middle of tubes at a distance of no less than 10 mm from the edge.

2.14.4 Organic material requirements for fire prevention purposes

The organic panelling material used in the engine compartment shall be neither flammable nor capable of absorbing fuel or lubricants (otherwise an impermeable coating will be applied).

The other organic materials used in the body shall be non-flammable and self-extinguishing according to the law in force in the country of destination of the vehicle.

Polyamide wires and electrical wiring passing near hot areas of the engine, such as exhaust manifold or exhaust pipe, turbo compressor, etc. shall be protected by a metallic shield made of aluminium or stainless steel coated by isolating material.

2.15 ANTIRUST BODY TREATMENT

2.15.1 Introduction

Antirust treatment is essential to ensure long life of the body and avoid perforating thin sections and sheets, etc.

Definition of the antirust treatment must ensure that application will not affect chassis parts, such as polyamide tubes, electrical wiring harnesses, valves, etc.

2.15.2 Preparation of the structure

The following important precautions shall be observed:

- Avoid accumulation and deposits of water, dust and dirt.
- Generally, cap the end of tubes.
- Direct open sections downwards.
- Make drain holes in closed profiles and in body compartments where water may condense of a diameter of approximately 8 mm, oriented downwards. Check that paint and antirust application does not obstruct the holes.
- Reinforce edges, wavy ledges, corners, etc. on the outer parts of the construction to permit the free flow of water. Suitable seals will be arranged where absolutely necessary.

2.15.3 Antirust treatment inside sections

A wax-based antirust product must be applied inside shell tubes in the following cases:

- windows downwards
- inside door pillars
- in horizontal structural tubes
- in chassis areas exposed to weather elements
- Expanded plastic may optionally be used; the product must comply with the health standards in force.
- Cover the holes used to introduce wax-based products with caps.

2.15.4 Antirust treatment on external structure

The outside of tubes will be protected with a base coat.

Areas welded using a gantry will be protected using weldable material.

2.15.5 Application of antirust treatment on sheets

Materials which protect the inner part of the body from chemical and mechanical attacks must be employed to protect from rust and isolate inner body parts; for example:

- Roof
  1) Apply dry base coat 20 to 30 μm, check adherence regularly.
  2) Apply polyurethane foam or rubber foam plates.

Antirust protection shall be applied to protect from gravel and foreign bodies and for waterproofing the wheelhouses in the areas subjected to contact with water.

Antirust treatment will be applied to protect the underbody using a highly viscous thixotropic product with a film thickness from 300 to 800 μm.

Particular attention will be devoted to the structural part joint areas and welded areas were non drying sealant paste providing good adherence will be applied.

Follow the manufacturer's instructions for perfect application of antirust products.

Outfitters will demonstrate the products used when required by IRISBUS Bus Quality Department.

2.15.6 Antirust protection using other materials

The use of high corrosion resistant materials is one way of ensuring antirust protection, such as stainless steel, plastic materials, fibreglass, etc. The use of these materials must always be compatible with the required resistance of each part.

2.15.7 Antirust protection tests

Antirust protection must pass salt mist resistance test lasting according to type of material and treatment (see chapter 4).

2.15.8 Battery compartment

The base of the compartment where the batteries will be housed must be painted using a high rust resistant process (see chapter 4). A wax-based protective coating (thickness 100 μm) will be applied. Outfitters shall provide regular maintenance.

2.15.9 Antirust protection maintenance

Regular maintenance is required to ensure efficiency of the antirust treatment. Outfitters shall provided the instructions needed for regular maintenance according to the characteristics of the body with the vehicle.

2.16 BODY PAINTWORK

The processes defined in chapter 4 will be applied to ensure the body quality level required by IRISBUS.

2.17 NOISE LEVELS AND THERMAL ISOLATION

Outfitters will be responsible for ensuring that the final vehicle complies with applicable standards. Outfitters will also be responsible for vehicle type-approval, if required.

The following procedure is recommended to obtain a high level of internal comfort and to comply with noise emission laws.

2.17.1 External noise

In accordance with the current standard in force in European Union countries, the maximum external sound emission level must be 83+1 dBA (applicable until 1 October 1995).

From 1 October 1995 for new type-approval and from 1 October 1996 for new registration, the standard specifies the maximum level of 80+1 dBA and adds specifications for the sound level generated by pneumatic components.

2.17.2 Internal noise - measuring method

Measurements will be conducted as specified in ISO 5128, in the following conditions:

Tests will be carried out with the following preset speeds:

- Manual transmission
  60, 80 and 100 km/h in the second to last gear
  80 and 100 km/h in the last gear
- Automatic transmission
  40, 60, 80 and 100 km/h button D
- Position of the phonometer
- Rear area middle of second to last row of seats at passenger's ear height
- Front area at driver's ear height

The following values must not be exceeded in any case in these conditions:

- Long distance vehicle
  Without air conditioning 72 dBA
  With air conditioning full power 74 dBA
- City vehicle
  Without air conditioning 74 dBA
  With air conditioning full power 76 dBA

Figures 2.28 and 2.29 show the positions of microphones for measuring internal noise.

Figure 2.28 (for types 397E.12.31 and 397E.12.35)

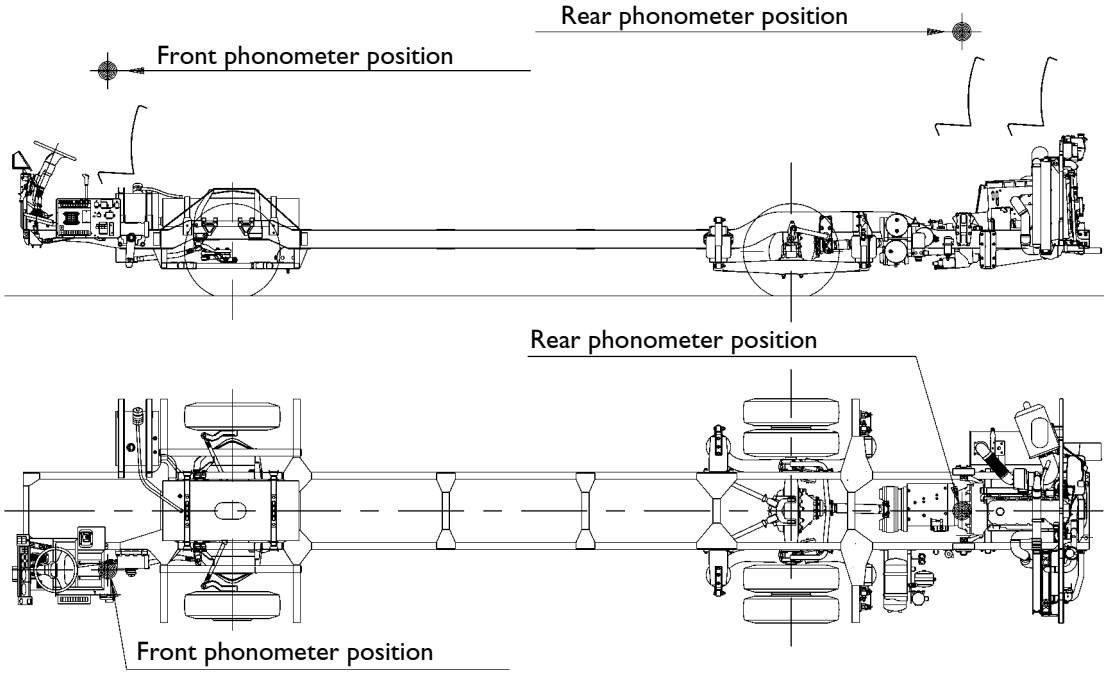
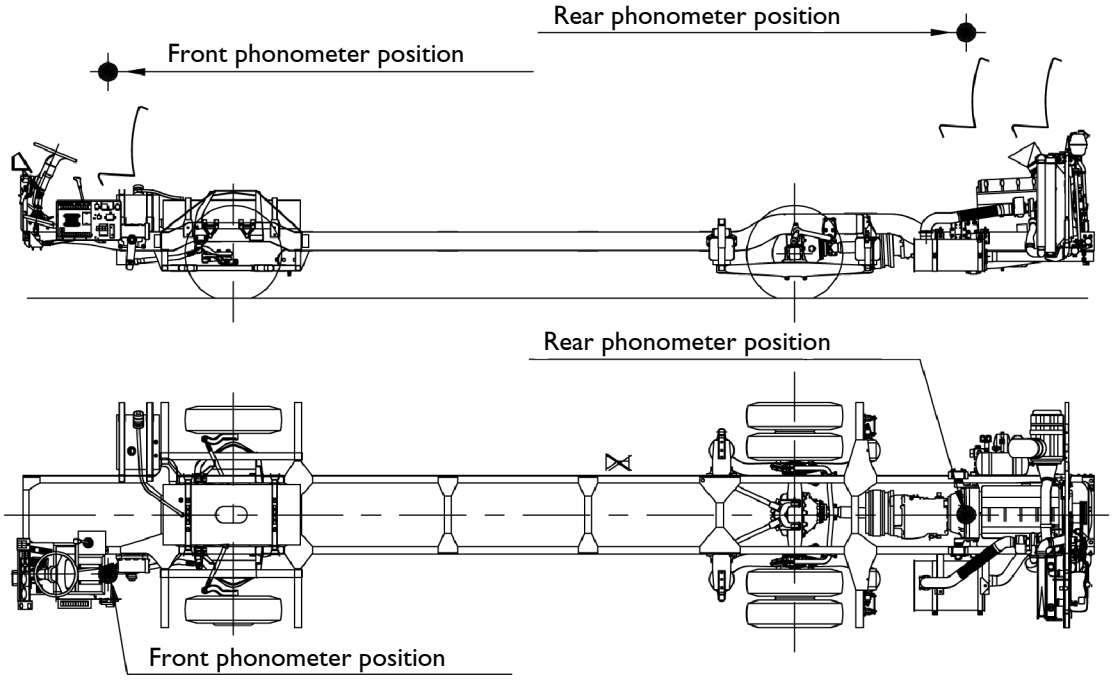


Figure 2.29 (for type 397E.12.43)



2.17.3 Soundproofing

Installation of soundproofing must be as continuous as possible; interruptions should be avoided.

Flaps or doors between passenger compartment and engine, transmission, axles areas, etc., must be adequately soundproofed.

The engine compartment walls must have three soundproofing elements:

- A) Dashboard with interposition of soundproofing layer (Septum or the like).
- B) Heavy mass fastened to metallic wall of compartment, minimum surface weight of 5 kg/m^2.
- C) Soundproofing material fastened to heavy mass or structural wall, thickness 30 mm, must comply with specifications defined in tables I and II.

The engine compartment walls separating the engine compartment from the outside (side and rear) must include heavy mass soundproofing joined directly to the plate, covered with soundproof material as defined in paragraphs B and C.

The lower enclosure must not hinder passage of cooling air from the radiator. The enclosure should concern only the area under the engine and possible the area to the right of the engine, avoiding the radiator so that exhaust is as free as possible.

Apply for soundproofing type-approval to IVECO Bus Engineering Department if in doubt. Tests will be at the applicant's expense.

The partitions separating the engine compartment from the vehicle interior made of Septum panels will be covered with soundproofing material on engine side as defined in paragraph C.
If the partitions are very close to the engine (vehicles with bed height of 800 mm or less), a layer of heavy mass may need to be arranged under the soundproofing. Metal partitions will be covered as described in the previous paragraph referred to external separation.

The engine compartment flaps must comply with the general specifications defined for partitions.

Use of 15 mm thick planks with an interposed Septum layer is recommended for covering the bed, the flaps in the bed and the door and step compartments.

Step compartment fastening must not present grooves or interruptions which permit the passage of noise inside. This applies to the area under the door.

The lower part of the engine compartment may need to be closed to comply with external noise standard (80+1 dBA).

- D) Outfitters may order the "Enclosed engine 03590" option for this purpose. Outfitters may construct their own enclosed version if the option cannot be fitted due to the characteristics of the body. The following requirements will be considered:

In this case the lower part shall consist of the following:

- Structural part: must be removable, made of plastic, steel sheet, aluminium sheet, etc.
- Heavy mass of thickness according to the weight of the structural material so that the total will have a minimum surface density of 10 kg/m^2.
- Soundproofing material 15 mm thick complying with the specifications in tables I and II. This material must be protected from possible leakage of fluid from the engine (oil, fuel, coolant, etc.).

The enclosure drawing shall consider the following:

- The enclosure must not hinder the passage of cooling air from the radiator.
- The enclosure must not interfere with the engine air vent exhaust pipe.
- The enclosure must be equipped with an approximately 150 mm hole for letting through engine oil. The hole will be provided with an aluminium cap whose inside is covered with soundproofing material, easily accessible to dump engine oil and 25 mm holes for dumping fluids.

The soundproofing material in the following list has been tested in IRISBUS laboratories to ensure specific results.

All materials must satisfy the specifications in paragraph 2.14.4 for fire protection. Isolating and soundproofing materials will be fastened in an adequately durable way to avoid dispersion or touching hot spots or moving parts. The use of good quality adhesive is recommended; alternatively metallic links or other containing devices may be employed.

TABLE I		TABLE II	
Measurement in reverberatory chamber as per DIN 52215 Standard		Measurement in Kundt tube as per DIN 52215 Standard	
Thickness..... 30 mm.		Thickness..... 15 mm.	
Octave band	Absorption coefficient	Octave band	Absorption coefficient
125	0,18	125	0,06
250	0,3	250	0,08
500	0,7	500	0,17
1000	0,9	1000	0,32
2000	0,95	2000	0,64
4000	0,98	4000	0,80

Figure 2.30 and 2.31 shows the soundproofing arrangement on all vertical walls of the engine compartment.

Figure 2.30 (for types: 397E.12.31 and 397E.12.35)

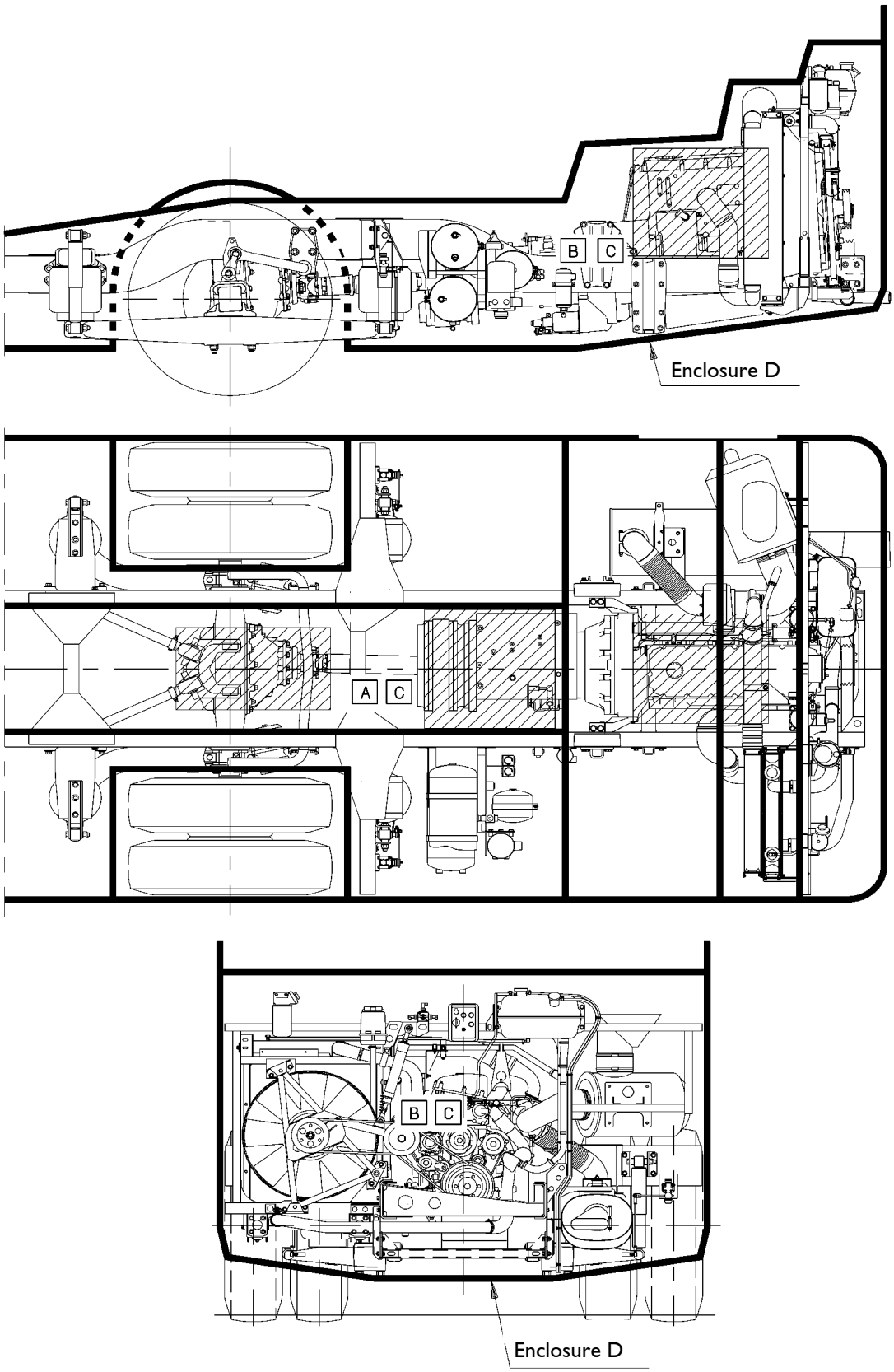
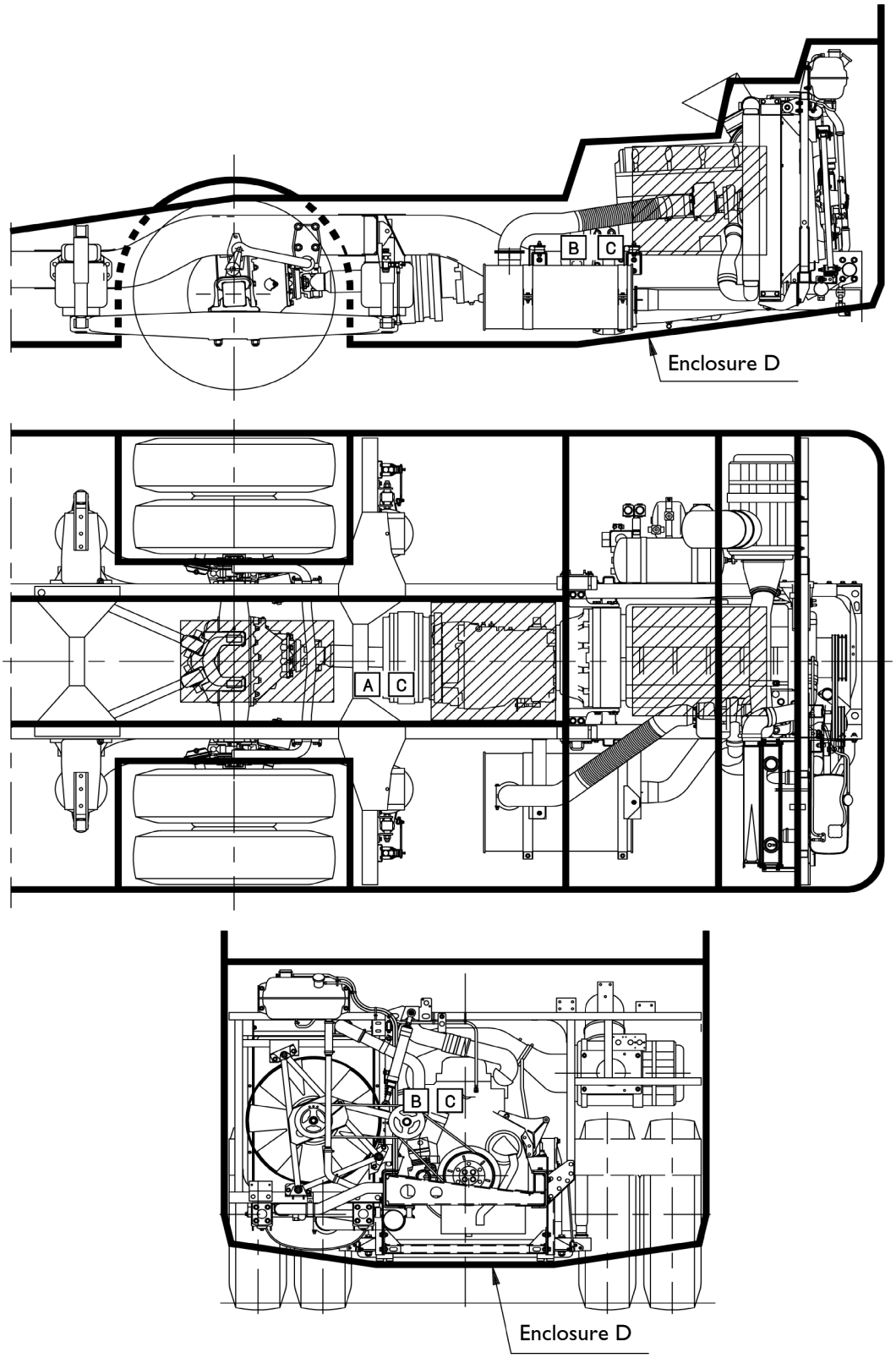


Figure 2.31 (for type 397E.12.43)



2.17.4 Heat isolation

The most critical points in terms of heat isolation are those where the temperature is higher, e.g. turbo compressor, exhaust manifold and pipe, muffler and electrical brake rotors.

Body parts made of organic material which is very close to a critical part where temperature may approach the maximum admitted value must be protected by means of a layer of isolating felt covered by aluminium foil capable of withstanding a stabilised temperature of 250°C with a maximum conduction coefficient of 0.1 W/m°K. In all cases, the minimum distance between the critical spot and isolation shall be no less than 80 mm.

Shielding by means of aluminium foil with sandwich isolation presenting a conduction coefficient comparable to that of felt may be employed where the available space is lacking especially to protect polyamide tubes and electrical wiring. A minimum distance between protected part and shielding must be 20 mm (see paragraph 2.14.4).

To ensure a comfortable temperature inside the vehicle, soundproofing between the engine compartment and transmission must have a minimum conduction coefficient of 0.08 W/m°K and a minimum operating temperature of 85°C. Correct arrangement of said heat isolating and soundproofing material must cover the entire surface between engine compartment and interior, comprising steps, walls and other surfaces which may allow penetration of heat.

Isolation by mean of a polyurethane foam with characteristics similar to those described is permitted in areas not requiring soundproofing, e.g. near the electrical brake.

Some non critical spots in terms of heat transmission must be distanced from body parts and systems to avoid damage due to excessive heat; the most important are: turbo compressor to intercooler ventilation pipe, air compressor exhaust pipe, engine crankcase and guards, coolant lines.

2.17.5 Cold climate isolation

Cold climate isolation must ensure that engine coolant does not drop under 80°C in stabilised running conditions.

The thermostat in the heating circuit opens at 68°±2°C and ensures correct operation of the engine. In cold climates the engine compartment may need to be closed to preserve heat. Closure will be performed as shown in figures 2.30 and 2.31 and will concern the following isolation areas:

- side walls
- rear
- engine compartment partitions inside vehicle
- lower closure (enclosure D in figures 2.30 and 2.31)
- front part: arrangement must have a width of approximately 30 mm from transmission to permit engine spring movements.

Materials and arrangement must satisfy the specifications in paragraphs 2.17.3 (for combined isolating and soundproofing) and 2.17.4 for all other cases.

Isolating panels must be partially mobile to be removed in summer to facilitate engine cooling.

A pre-heater must be fitted if engine isolation works at less than 80°C or if coolant temperature is not sufficient for heating. The pre-heater must be fitted in all cases in which the vehicle using works at temperatures lower than 0°C. Figure 2.32 shows a recommended system circuit. Always follow the pre-heater manufacturer's instructions and contact IVECO if in doubt. Minimum pre-heater power must be 25000 kcal/hour.

Engine isolation efficacy must be measured and tuning may be required after definition.

The procedure will consists of two tests, one for measuring cooling system capacity and the other for measuring heating capacity.

Cooling capacity test:

Test conditions

- Engine rpm: approximately 1300
- Maximum power at said rpm
- Adequate time for temperature stabilisation
- Engine thermostats in open position
- Permanently running cooling fan (clutch blocked)
- Mobile isolation panels open

Measurements:

- Coolant temperature Tar
- Ambient temperature Taa
- Engine oil temperature Tom
- Engine mount temperature Tsem
- Maximum temperature in engine compartment Tmass

Maximum admitted values:

- Tar-Taa= 65°C
- Tom-Taa = 90°C
- Tsem-Taa = 45°C
- Tmass.-Taa = 55°C

Heating test

Test condition. Mixed motorway and mountain road, ambient air temperature close to minimum of the climate of destination of the vehicle.

Measurements:

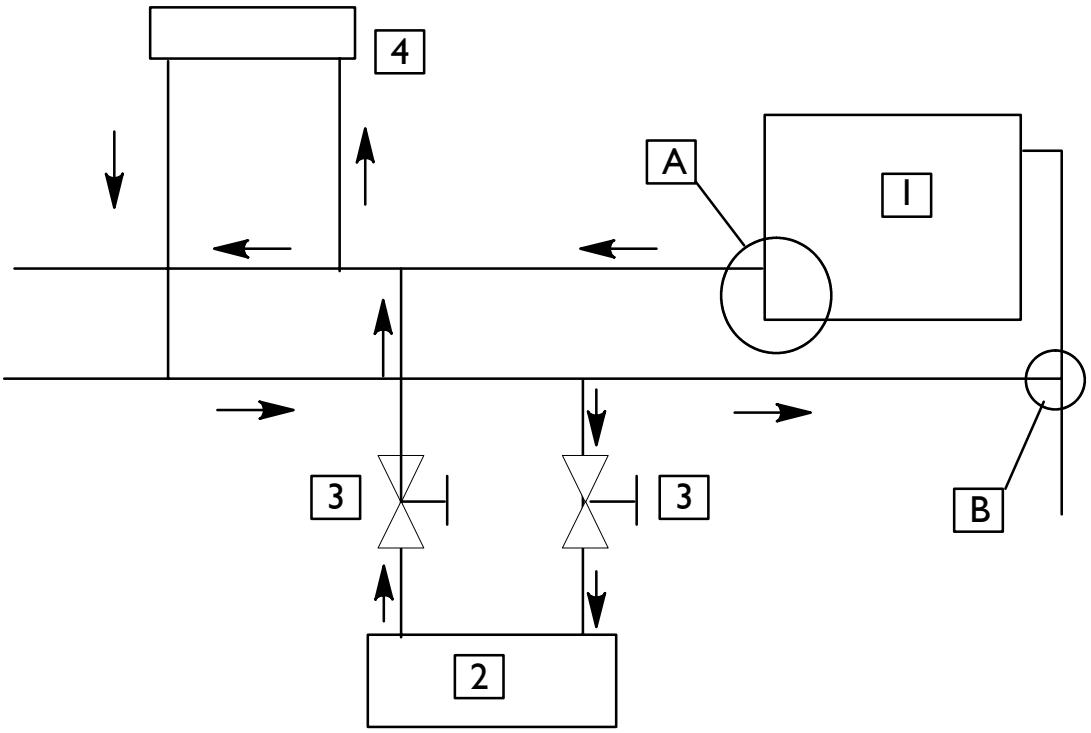
Engine coolant temperature. Temperature inside compartment.

Admitted values:

Coolant temperature must not drop under 80°C. Internal temperature must not be less than 18°C. Consequently, the heating system will be defined in accordance with the external temperature at which the vehicle works.

Redefinition of isolation and heating system may be required after testing, by increasing power or isolation if heating test results are low or increasing air passage and decreasing isolation if temperatures obtained in the cooling test are excessively high. It is advisable to inform IVECO of the results and jointly define possible modifications.

Figure 2.32



Coolant pre-heater assembly diagram

1. ENGINE - 2. PRE-HEATER - 3. TAP - 4. HEATER - A) HEATER COOLANT OUTLET (see paragraph 2.8.16 Figures 2.23 and 2.24) - B) HEATER COOLANT RETURN (see paragraph 2.8.16 Figures 2.23 and 2.24)

2.18 FUNCTIONAL ROAD TESTS TO BE CARRIED OUT BY OUTFITTER

The following tests will be carried out with the vehicle stationary before starting the function test procedure:

- Tyre pressure, engine oil level, transmission and axle, clutch, brake and steering fluids, coolant, suspension height, maximum braking pressure on each axle and maximum pressure in reservoirs, exhaust pressure in pressure regulator; check and hold pressure in pneumatic circuits, handbrake operation.
- Operation of door, emergency button sensitivity, warning lights, windscreen wiper, windscreen washer and horn.
- External lights: taillights, dipped-beam, main-beam, indicators, brake, reversing, engine disconnect rear flap interlocking, battery status and level.
- Body alignment with respect to the chassis.
- No interference of steering linkage in all steering wheel and wheel positions.

Conduct road test on a distance of 50 km on various types of roads (flat, curves, gradients, rough surface) and check the following parameters:

- No anomalous vibrations or noise during normal vehicle operation due to transmission, axle and other parts of chassis or body.
- Correct transmission operation, normal gear shifting up and down without jerking (automatic transmission versions).
- Braking must be responsive, gradual without requiring excessive effort on the pedal. All samples should be off after dumping the regulator.
- ABS operation: red LED on dashboard on with vehicle stationary and off while vehicle is running. Action of modulating valves on each wheel must be felt with vehicle running and the brakes are fully applied.
- Operation of Telma brakes or Voith hydraulic brakes in automatic transmission: prompt response and gradual action in each points of operation.
- Emergency brake operation: check correct operation without jerks.
- Emergency button operation (Regulation 36): check operation on engine (connector indicator, disconnected batteries and cut off fuel).
- Operation and sealing of tachograph.
- Check correct operation of HVAC system.
- Steering must be gradual, without stiffness or jerking; the vehicle must be held straight without requiring continuous corrections and will ensure total control also in the event of sudden manoeuvres.
- Steering circle according to Regulation 36.
- Body watertightness of wheelhouses under rain.
- Check internal and external sound levels.
- Check ergonomics of controls and dashboard:
  Gear lever: stroke, stiffness, interference with dashboard and seat.
  Retarder control: interference with steering wheel and accessibility.
  Seat position: regulation and access to controls and pedals.
  Access to pedals and stiffness of operation.
  Height and slant of steering wheel must be adjustable.
  Clutch pedal operation must be gradual.
  Dashboard: visibility, correct operation of indicators and buzzers, visual interference of steering wheel, luminosity and illumination.
- Check for possible leakage of water, oil, fuel brake, steering and clutch fluid at end of road test.
- Check tightening torque of wheel bolts (must be 599 - 732 Nm).

2.19 BODY ELECTRICAL SYSTEM

No variation of loads or modifications of the electrical system provided with the chassis, necessary for chassis operation, is allowed.

Modifications by outfitters of any of the mentioned points will require written authorisation by IRISBUS Quality Department. Initial characteristics shall be ensures if lengthening or shortening of battery wires is required, specifically: terminal size, protective sheath and cross-section area.

Electrical lines included by outfitters for operating electrical components shall respect the following specifications:

- All systems will be closed in fireproof or self-extinguishing plastic tubes.
- Said protections will be extended to the point in which they are as close as possible to the connection.
- Wire cross-section area will be suitable to satisfy voltage drop and maximum current density requirements. Minimum cross-section area will be 1 mm2 for types 397E.12.31 and 397E.12.35, while it will be 1.5 mm2 for type 397E.12.43.
- All circuits will be protected by fuses. Relays will be grouped together in a box for protection. A diagram indicating internal connections will be applied on the lid of the box.
- Course and fastening will be suitable to ensure distance from moving vehicle parts to prevent damage, such as pulleys, revolving parts, suspension components, steering linkages, battery carriage, etc. (see figure page 2.53 for types 397E.12.31 and 397E.12.35, while see figure page 2.54 for type 397E.12.43).

2.19.1 Blinker

The blinker will be suitable to the number of direction indicator bulbs required according to body design. Any marketed blinker may be fitted.
Iveco references are:

500324835 for four 21 W bulb load on each side
500339158 for three 21 W bulb load on each side
50033O114 for two 21 W bulb load on each side.

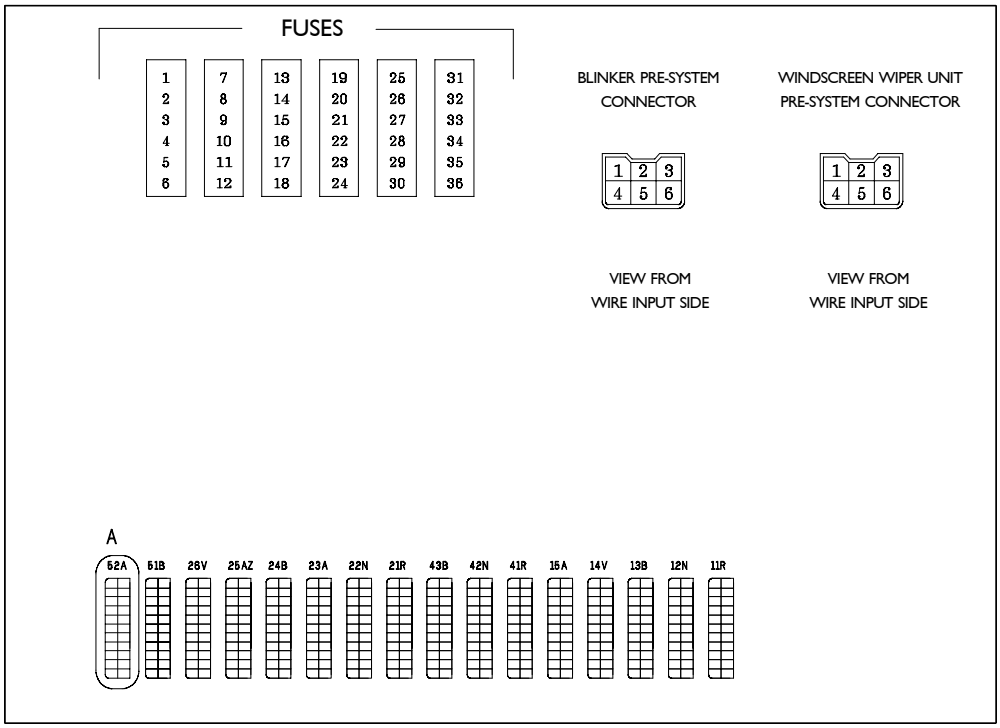
These devices can be mechanically and electrical adapted to the circuit diagram and can be ordered from IVECO
(see figure 2.35 page 2-55).

2.19.2 Windscreen wiper timer

The chassis includes arrangement for upgrading the windscreen wiper motor timer according to the diagram shown
(see figure 2.36 page 2.55).

The timer must be chosen according to the corresponding electrical characteristics of the windscreen wiper motor on the vehicle.

Figure 2.33 (for types 397E.12.31 and 397E.12.35)
RELAY AND FUSEBOX CONNECTION DETAILS


FUSES
1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17 18
19 20 21 22 23 24
25 26 27 28 29 30
31 32 33 34 35 36
BLINKER PRE-SYSTEM CONNECTOR
1 2 3 4 5 6
VIEW FROM WIRE INPUT SIDE
WINDSCREEN WIPER UNIT PRE-SYSTEM CONNECTOR
1 2 3 4 5 6
VIEW FROM WIRE INPUT SIDE
A
52A 51B 26V 25AZ 24B 23A 22N 21R 43B 42N 41R 15A 14V 13B 12N 11R

DETAIL -A-

52A

12	1
13	2
14	3
15	4
16	5
	6
17	7
18	8
19	9
20	10
21	11

CONNECTOR 52A

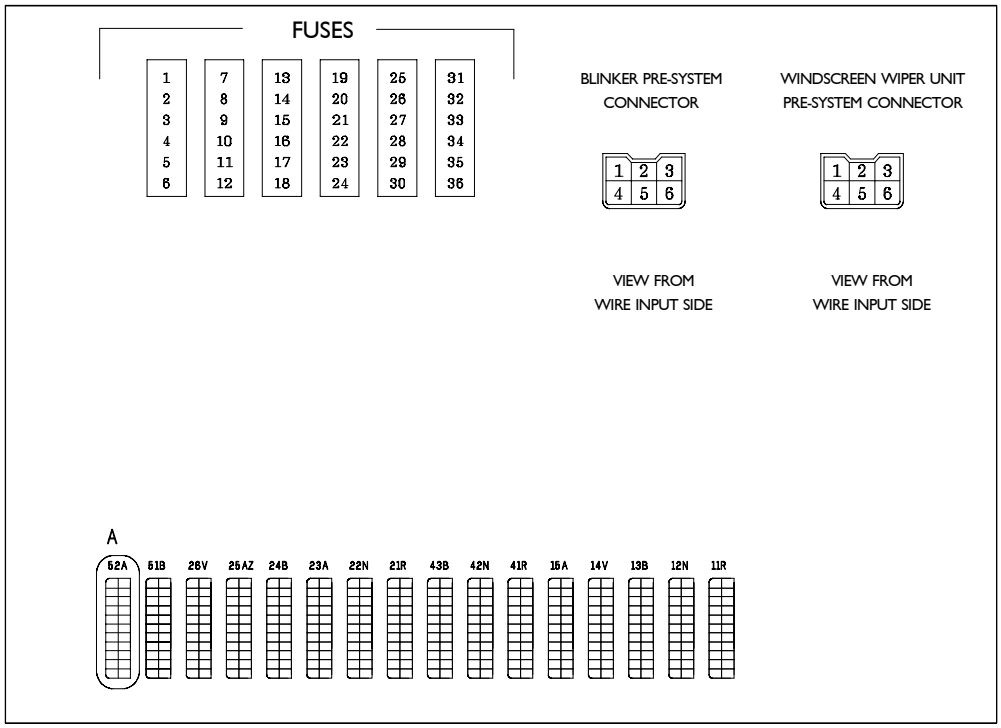
PIN	WIRE	FUNCTION
1	4536	OUTPUT +24 V A HORN
2	2122	OUTPUT +24 V A LEFT MAIN-BEAM HEADLIGHT
3	2123	OUTPUT +24 V A RIGHT MAIN-BEAM HEADLIGHT
4	2114	OUTPUT +24 V A LEFT DIPPED-BEAM HEADLIGHT
5	2113	OUTPUT +24 V A RIGHT DIPPED-BEAM HEADLIGHT
6	2006	OUTPUT + 24 V A LEFT INDICATOR
7	2007	OUTPUT +24 V A RIGHT INDICATOR
8	3551	INPUT 0V OUTFITTER DOORS (ecas)
9	2104	OUTPUT +24 V A LEFT TAILLIGHT
10	2105	OUTPUT + 24 V A RIGHT TAILLIGHT
11	9108	OUTPUT 0V A WINDSCREEN WASHER FLUID LEVEL SENSOR
12	3563	0 V DOOR OPEN PARKING BRAKE INPUT
13		FREE
14		FREE
15		FREE
16		FREE
17		FREE
18		FREE
19		FREE
20	4503	OUTPUT + 24 V A WINDSCREEN WASHER PUMP
21	3409	0 V WINDSCREEN WASHER LEVEL WARNING LIGHT INPUT

FUSES

FUSES

NUMBER	VALUE	FUNCTION
1	15A	WARNING
2	7,5 A	HORN
5	7,5A	LEFT DIPPED-BEAM HEADLIGHT
6	7,5 A	RIGHT DIPPED-BEAM HEADLIGHT
7	7,5 A	LEFT MAIN-BEAM HEADLIGHT
8	7,5 A	RIGHT MAIN-BEAM HEADLIGHT
9	7,5 A	LEFT TAILLIGHTS
10	7,5 A	RIGHT TAILLIGHTS
19	15 A	WINDSCREEN WIPER MOTOR

Figure 2.33 for type 397E.12.43)
RELAY AND FUSEBOX CONNECTION DETAILS


FUSES
1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17 18
19 20 21 22 23 24
25 26 27 28 29 30
31 32 33 34 35 36
BLINKER PRE-SYSTEM CONNECTOR
1 2 3 4 5 6
VIEW FROM WIRE INPUT SIDE
WINDSCREEN WIPER UNIT PRE-SYSTEM CONNECTOR
1 2 3 4 5 6
VIEW FROM WIRE INPUT SIDE
A
52A 51B 26V 25AZ 24B 23A 22N 21R 43B 42N 41R 15A 14V 13B 12N 11R

DETAIL -A-

52A

12	1
13	2
14	3
15	4
16	5
	6
17	7
18	8
19	9
20	10
21	11

CONNECTOR 52A

PIN	WIRE	FUNCTION
1	4536	OUTPUT +24 V A HORN
2	2122	OUTPUT +24 V A LEFT MAIN-BEAM HEADLIGHT
3	2123	OUTPUT +24 V A RIGHT MAIN-BEAM HEADLIGHT
4	2114	OUTPUT +24 V A LEFT DIPPED-BEAM HEADLIGHT
5	2113	OUTPUT +24 V A RIGHT DIPPED-BEAM HEADLIGHT
6	2005	OUTPUT + 24 V A LEFT INDICATOR
7	2007	OUTPUT +24 V A RIGHT INDICATOR
8		FREE
9	2104	+ 24 V LEFT TAILLIGHT OUTPUT
10	2105	+ 24 V RIGHT TAILLIGHT OUTPUT
11		FREE
12	7399	+ 24 V TRAILER INDICATOR WARNING LIGHT INPUT
13	7398	+ 24V FRONT FOGLIGHT WARNING LIGHT INPUT
14	7305	0V BODY UTILITY CUT-OFF DURING IGNITION OUTPUT
15	7344	0V BODY DOOR OUTPUT
16	3710	+ 24 V CLOSED DOOR WARNING LIGHT INPUT
17	3521	0V FRONT ROOF OPEN WARNING LIGHT INPUT
18	3522	0V REAR ROOF OPEN WARNING LIGHT INPUT
19		FREE
20	4503	OUTPUT + 24 V A WINDSCREEN WASHER PUMP
21	3409	0 V WINDSCREEN WASHER LEVEL WARNING LIGHT INPUT

FUSES

FUSES

NUMBER	VALUE	FUNCTION
2	15A	WARNING
9	7.5 A	LEFT DIPPED-BEAM HEADLIGHT
10	7.5 A	RIGHT DIPPED-BEAM HEADLIGHT
11	7.5 A	LEFT MAIN-BEAM HEADLIGHT
12	7.5 A	RIGHT MAIN-BEAM HEADLIGHT
19	15 A	WINDSCREEN WIPER MOTOR
31	7,5 A	LEFT TAILLIGHTS
32	7.5 A	RIGHT TAILLIGHTS
35	7.5 A	HORN

Figure 2.35

BLINKER CONNECTION DIAGRAM
Fit a blinker suited to the loads defined by the outfitter.

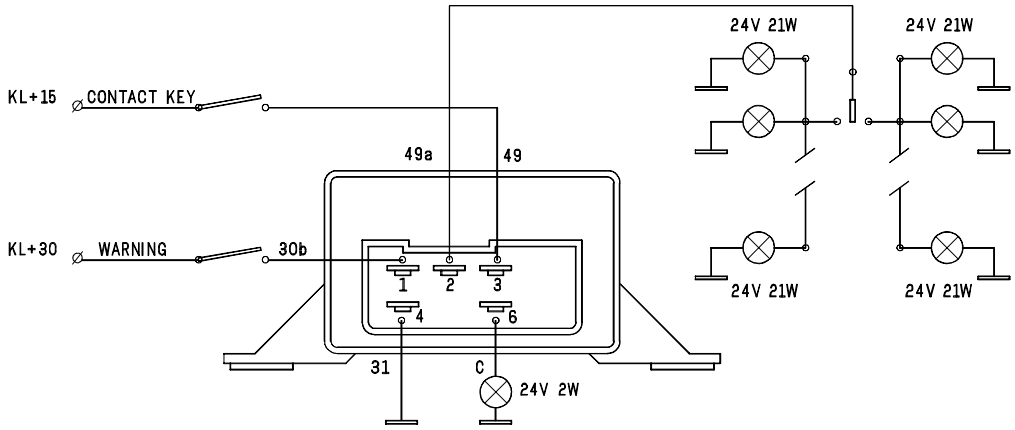
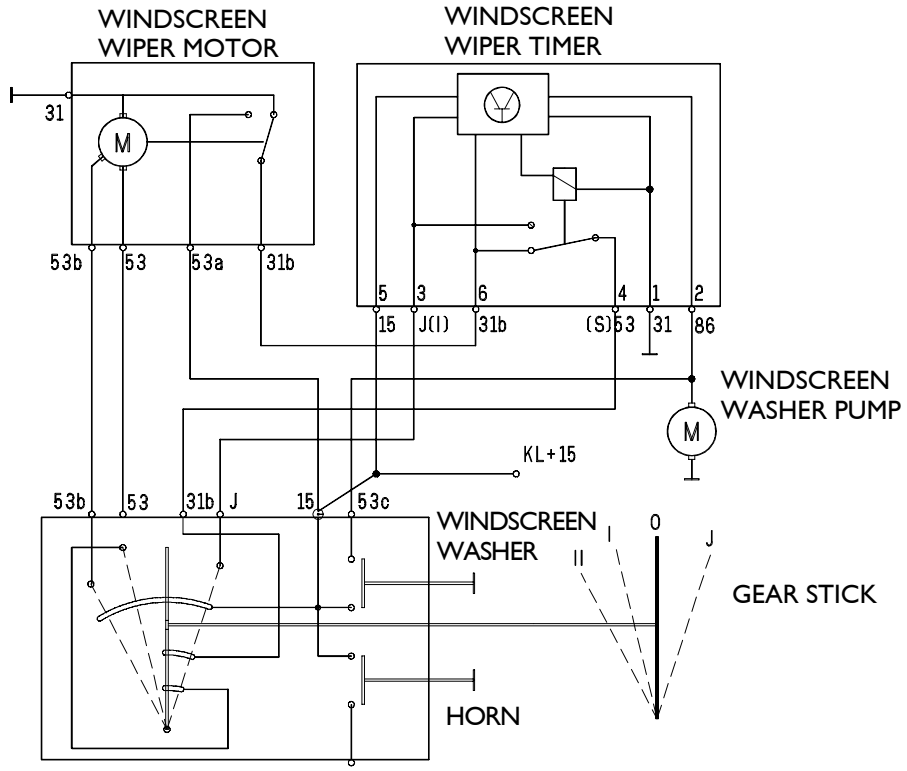


Figure 2.36

WINDSCREEN WIPER TIMER CONNECTION DIAGRAM



2.19.3 Rear light connections

The connectors located in the rear part of the chassis will be used to connect to the rear lights.
Right rear connector.

Right rear connector

Pin nr.	Wire nr.	Function
1	2009	INDICATOR
2	2152	FOGLIGHT
3	9204	EARTH
4	2103	TAILLIGHT
5	4591	REVERSING
6	4601	BRAKE

Left rear connector

Pin nr.	Wire nr.	Function
1	2008	INDICATOR
2	2152	FOGLIGHT
3	9203	EARTH
4	2102	TAILLIGHT
5	4591	REVERSING
6	4601	BRAKE

2.19.4 Earth point distribution on chassis

Existing earth points may be used for body systems requiring earth connections to the chassis; respect body constrains, tightening torque and maximum contact surface (see figures 2.37-2.38 page 2.57).

2.20 HEATING SYSTEM AND SELF-STANDING HEATER

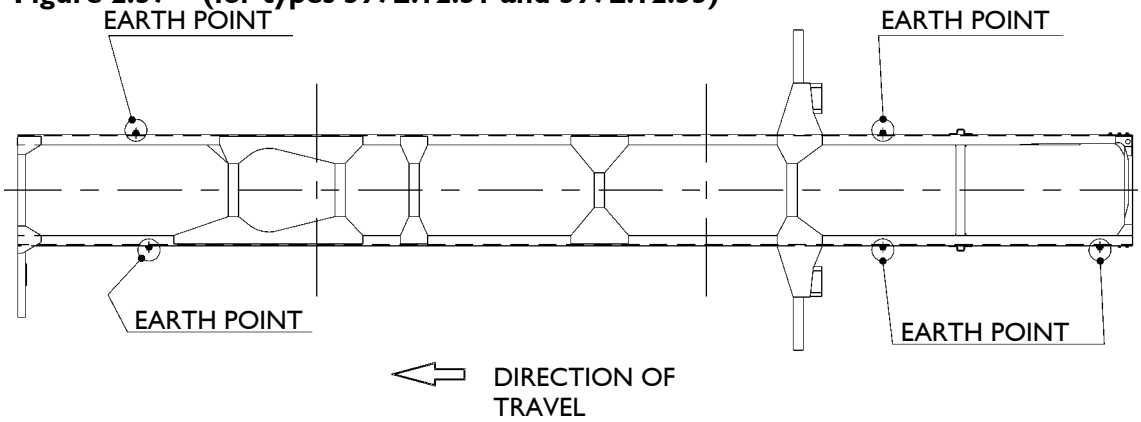
The connection point for the heating system to the engine cooling system is shown in paragraph 2.8.16. Additional lines must be made of brass or other corrosion-resistant alloy. Connection bushes must comply with specifications stated in IRISBUS Standard 18-0400.

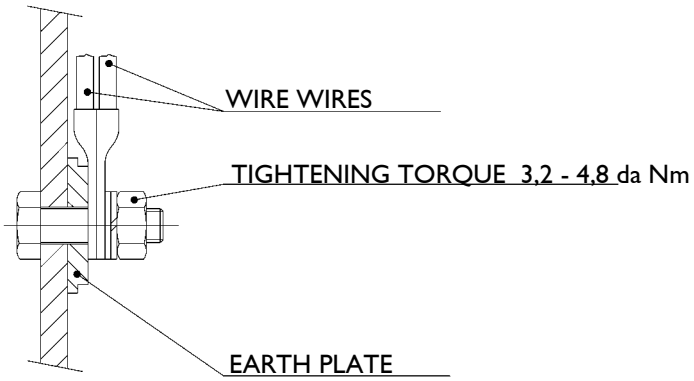
Heaters must be equipped with breathers for dumping air and dump taps.

An additional heater will be fitted in vehicles to be used in climates requiring extra heating power.

Fill the system after construction using Paraflu 11 (see Service Manual).

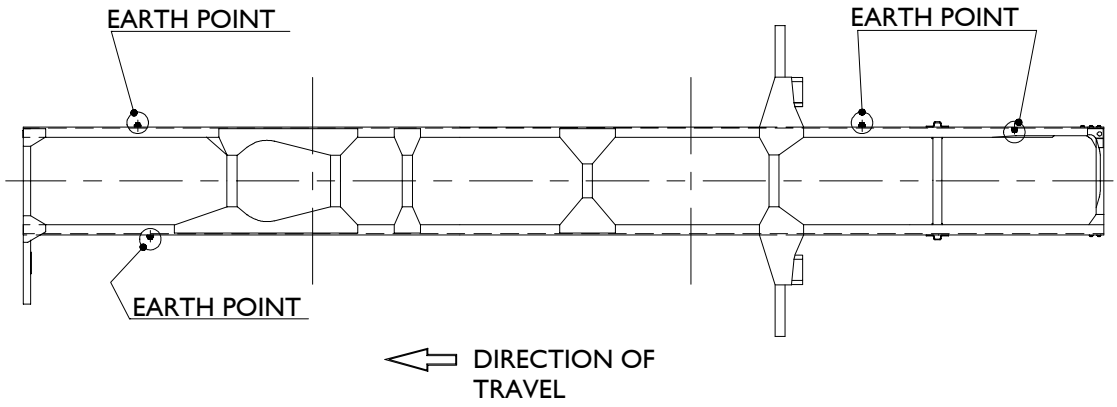
Figure 2.37 (for types 397E.12.31 and 397E.12.35)

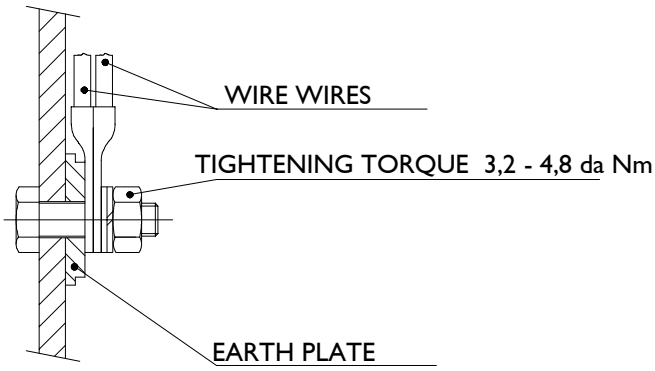




GROUND PLUG INSTALLATION DETAIL

Figure 2.38 (for type 397E.12.43)





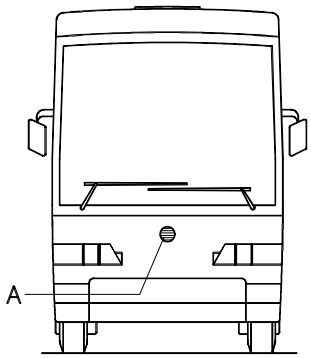
GROUND PLUG INSTALLATION DETAIL

2.21 MANUFACTURER'S IDENTIFICATION

Front:

- **A)** One "DELFINO" emblem Ref. 5006210564 centred.
  See arrangement in figure 2.39.

Figure 2.39



A Ideal position

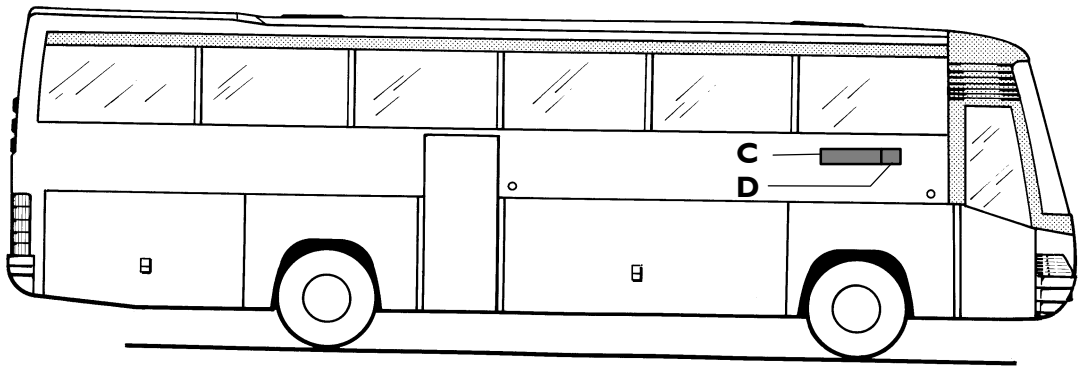
Side:

- **C)** Two "EuroRider" IVECO Ref 9945 4806 on each side of the vehicle under the first passenger window.
- **D)** See acronym explanations in figure 2.41 -2.42

Examples of C and D sticker positioning:
EuroRider C 31
EuroRider C 31.A
EuroRider C 31.A.SRI
EuroRider D 43
EuroRider D 43.A
EuroRider D 43.A.SRI

See arrangement in figure 2.40

Figure 2.40

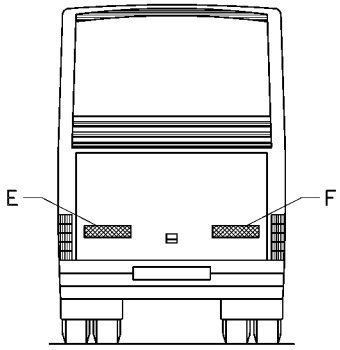


Rear:

- **E)** One "IRISBUS" emblem Ref. 5006210565 on left side.
- **F)** 1 anagramma "IVECO" rif.500364642 posto nella parte destra (solo per 397E.12.43 A-C ASTRONIC).
- **F)** One "IVECO" emblem Ref. 500364642 on right side (for 397E.12.43 A-C ASTRONIC only)

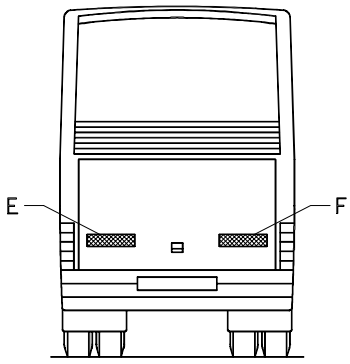
See arrangement in figures 2.41 and 2.42.

Figure 2.41 (for types 397E.12.31 and 397E.12.35)



397E.12.31 (BOGIE) ZF S6-1600+TELMA	"C-31"	5006300330	KZ
397E.12.31A (BOGIE) ZF-5HP	"A"	5006300345	KZ
	"C-31"	5006300330	KZ
397E.12.31 (BOGIE)SRI ZF S6-1600+TELMA	"C-31"	5006300330	KZ
	"SRI"	5006300340	KZ
397E.12.31A (BOGIE)SRI ZF-5HP	"A"	5006300345	KZ
	"C-31"	5006300330	KZ
	"SRI"	5006300340	KZ
397E.12.35A (BOGIE) ZF-5HP	"A"	5006300345	KZ
	"C-35"	5006300335	KZ
397E.12.35 (BOGIE) ZF S6-1600+TELMA	"C-35"	5006300335	KZ
397E.12.35A (BOGIE)SRI ZF-5HP	"A"	5006300345	KZ
	"C-35"	5006300335	KZ
	"SRI"	5006300340	KZ
397E.12.35 (BOGIE)SRI ZF S6-1600+TELMA	"C-35"	5006300335	KZ
	"SRI"	5006300340	KZ
DELFINO IRISBUS		5006210564	EY
INITIALS IRISBUS		5006210565	EY

Figure 2.52 (for type 397E.12.43)



397E.12.43 A - C (BOGIE) 8S - 180+ TELMA	"D - 43"	5006300325	KZ
397E.12.43 A - C (BOGIE) ZF-ASTRONIC	"A"	5006300345	KZ
	"D - 43"	5006300325	KZ
397E.12.43 A - C (BOGIE) 8S - 180+ TELMA	D - 43"	5006300325	KZ
SRI	"SRI"	5006300340	KZ
397E.12.43 A - C (BOGIE)	"A"	5006300345	KZ
ZF - ASTRONIC	"D - 43"	5006300325	KZ
SRI	"SRI"	5006300340	KZ
DELFINO IRISBUS		5006210564	EY
INITIALS IRISBUS		5006210565	EY

2.22 MODULAR BODY VERSION

2.23 INTRODUCTION

The EuroRider range presents two basic versions:

a) The stiff chassis (6150 mm wheelbase) is arranged to be equipped with a whole chassis.

b) Bogie chassis, 3000 mm wheelbase, suitable for cutting side-members and adding a central structure integrated in body construction. Final vehicle wheelbase must be from 5900 mm to 6900 mm.

Instructions for constructing a modular body on a bogie chassis are provided in the following paragraphs to prevent damage to mechanical parts.

2.24 CHASSIS DELIVERY

The vehicle is delivered with a 3000 mm wheelbase; the front and rear projections are the same as those described in the previous sections.

Chassis system length is suitable for constructing a modular body with a 6900 mm wheelbase.

2.25 CHASSIS PREPARATION

Release the following parts before cutting the chassis side-members:

electrical wiring harnesses, polyamide tubes, transmission control cables, power steering cables. Remove clutch control copper piping.

This will facilitate work after cutting the side-members and assembly in the central area of the compartment.

2.26 ALIGNMENT

This operation consists in levelling the chassis on stands (at least four stands for the front module and four of the rear module - see figures 2.43 and 2.44).

Figure 2.43 (for types 397E.12.31 and 397E.12.35)

Stand arrangement for chassis levelling (at least for per module)

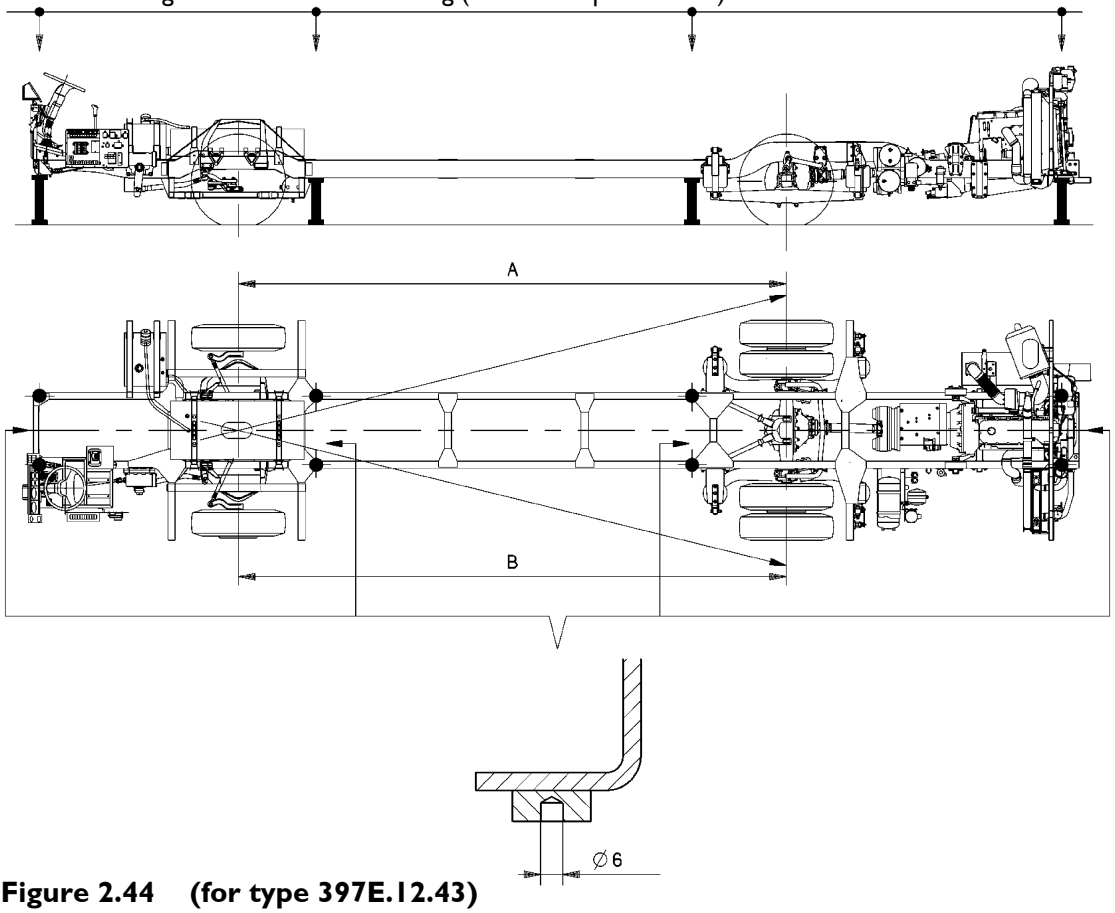
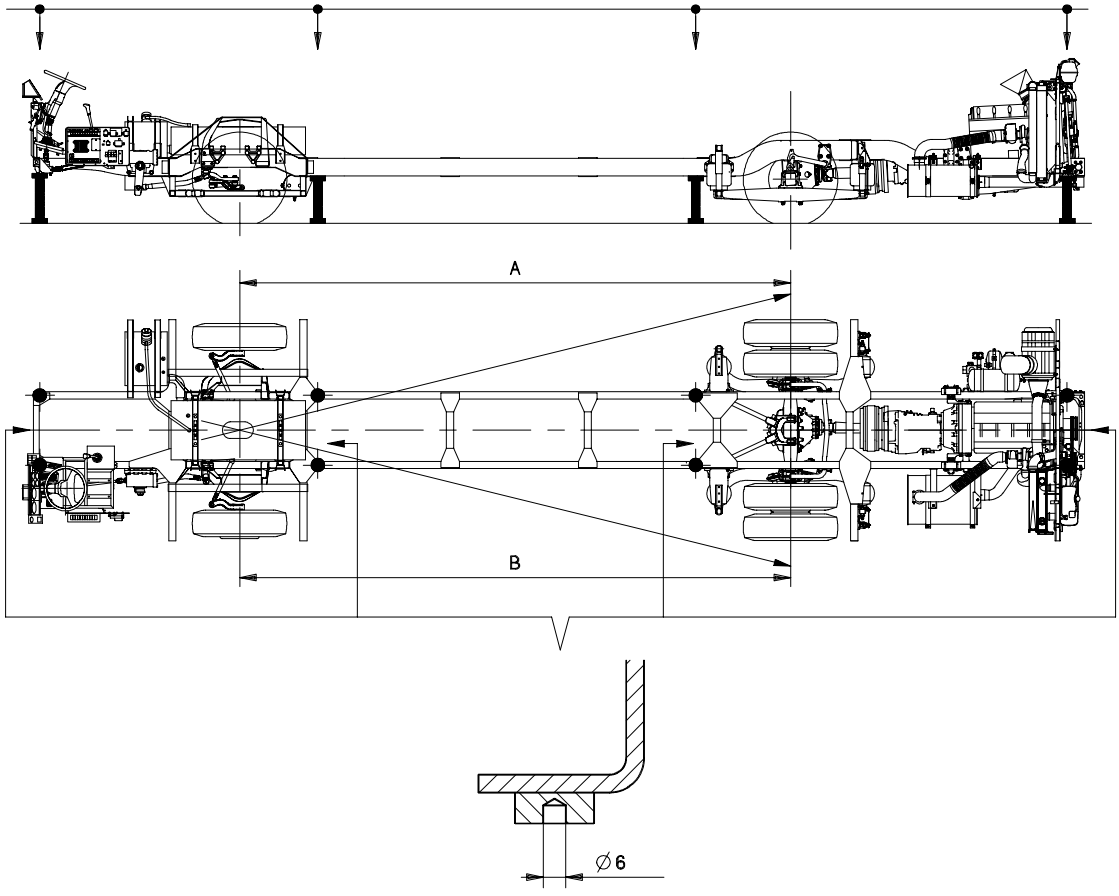


Figure 2.44 (for type 397E.12.43)

Stand arrangement for chassis alignment (at least for per module)



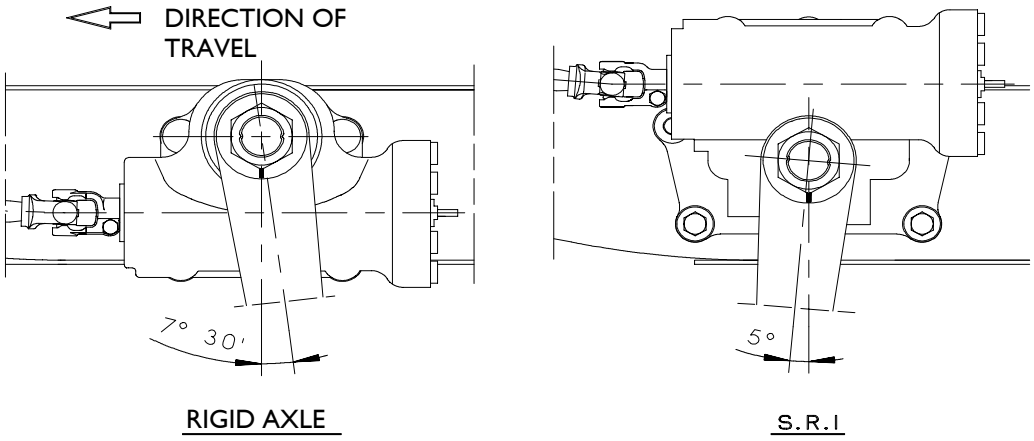
A-B (difference between measurements shall not exceed 5 mm).

Levelling heights are specified in paragraph 2.5.2 "Preliminary body assembly operations".

After levelling and before cutting the chassis, check that it is the right way up and totally stationary. The rear module must remain stationary especially after cutting.

A specifically designed alignment and clamping fixture may be used instead of stands.

Figure 2.45



2.27 CUTTING THE CHASSIS

After ensuring levelling and immobilisation of the chassis, the side-members can be cut respecting the minimum measurements shown in figures 2.46 and 2.47.

Side-members must be cut along a plane which is perpendicular to the longitudinal axis of the vehicle making sure that both side-members at of the same length. Cutting mistakes will cause incorrect rear assembly. Check length before the following operations, correct if required.

The front module can be moved after cutting to obtain the distance between axles of the vehicle with body. The chassis must be checked in this position before fitting the armature.

Check alignment by means of four reference points on the lower part of the chassis (two on front module and two on rear module), if required. Similarly, check that the left wheel and right wheelhouses are the same. Dimensions A and B must also be the same, with a maximum difference of 5 mm (see figure 2.43 and 2.44).

To check correctness of dimensions A and B, turn the front wheels to straight position and check that the reference marks on the steering and lever coincide (see figure 2.45).

The four reference points (see figure 2.43 and 2.44 for position and details) are used to determined the longitudinal half axis of the vehicle.

After verifying alignment, check the levelling of the front and rear modules are specified in paragraph 2.5.2 and immobilise the parts. Front section alignment must be maintained after this. Start assembling the central structure after ensuring correct operation on both modules.

Cutting and positioning procedure described here is only an example. Other methods employing positioning tools made by used to ensure correct alignment and levelling of the chassis.

Figure 2.46 (for types 397E.12.31 SRI/ER and 397E.12.35 SRI-ER)

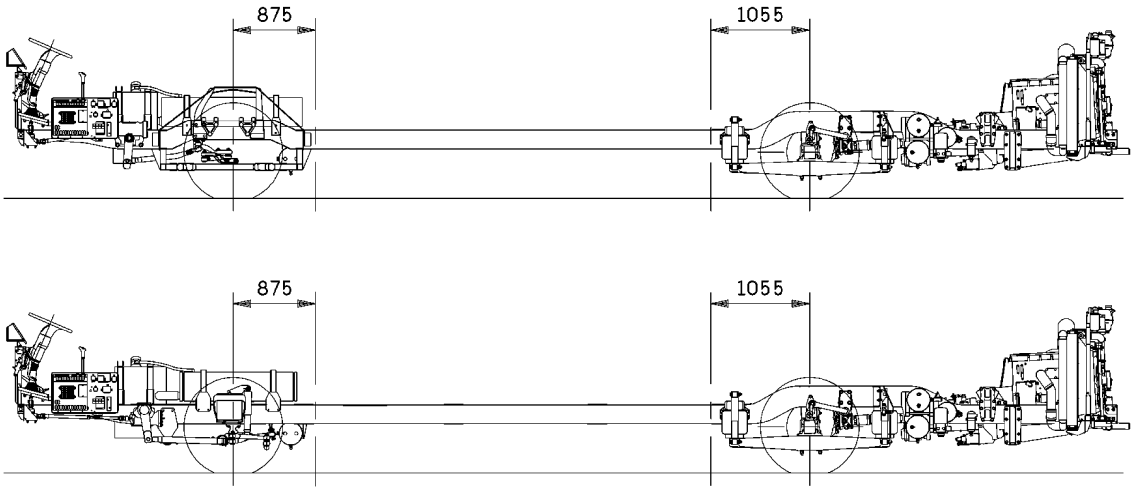
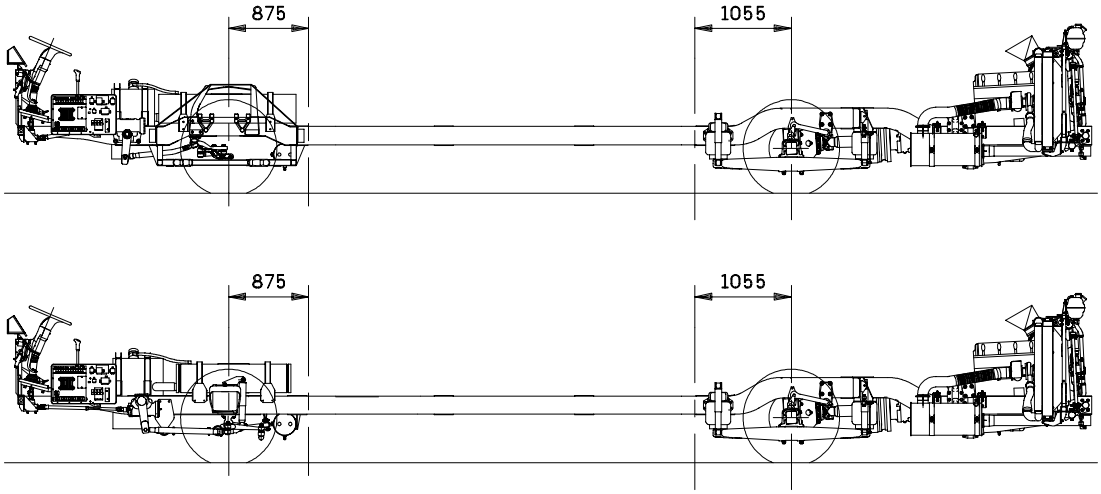


Figure 2.47 (for types 397E.12.43 SRI/ER)



Level and immobilise the chassis as described and include the central structure to form a stiff structure before cutting the side-members.

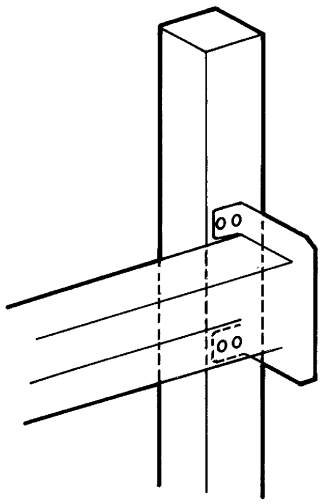
2.28 CENTRAL STRUCTURE CONFIGURATION

The central structure (compartment area) must be rectangular, designed and dimensioned to withstand the flexural and torsional stress and optimise resistance-weight ratio.

Section changes must be as gradual as possible to avoid concentration of stress, especially in the areas corresponding to doors and washbasins.

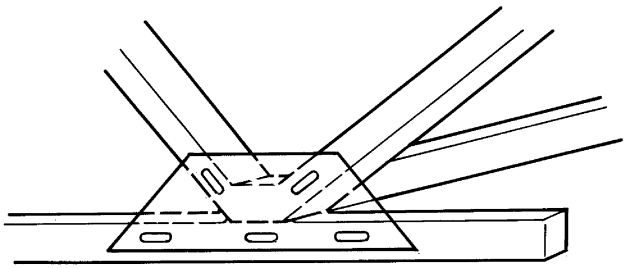
Structural section connections must withstand the stress to which they are subjected and connected sections should have similar thickness. In any case, insert reinforcements to improve stress distribution (see figure 2.48).

Figure 2.48



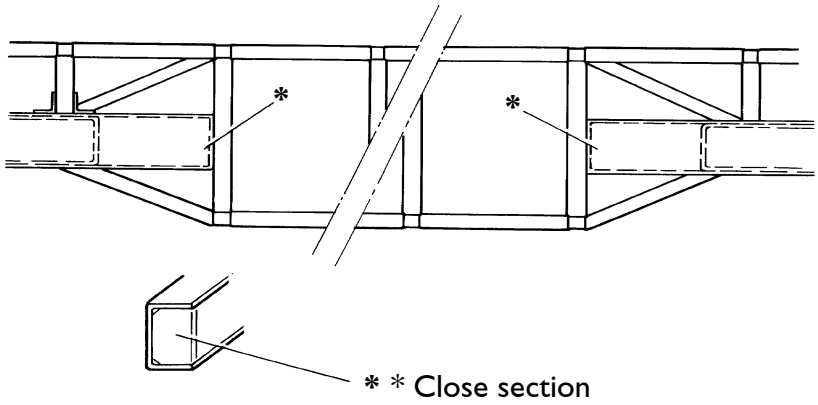
The use of connection plates is recommended for nodes where various sections converge (see figure 2.49).

Figure 2.49



Correct connection between central structure and chassis side-members is obtained by closing the side-member section welding a vertical tube onto it and connecting the tube to the horizontal tubes of the magazine then applying a diagonal stiffener connecting the lower vertex to the central side-member box (see figure 2.50).

Figure 2.50



The rest of the structure-chassis connections (especially the shelves) will be made as shown in figures 2.51-2.52-2.53-2.54. Intermediate reinforcements are used to ensure optimal passage between sections without creating punctual stress which may cause cracking due to fatigue.

Figure 2.51

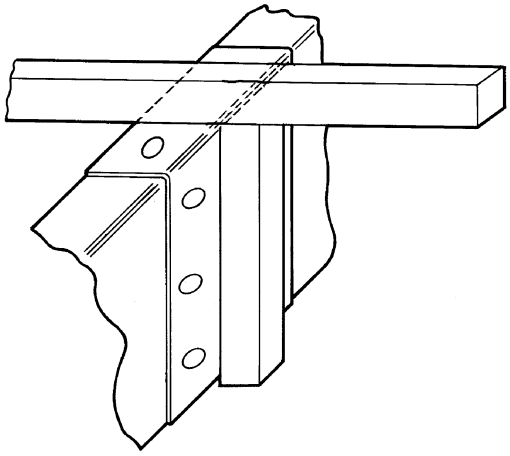


Figure 2.52

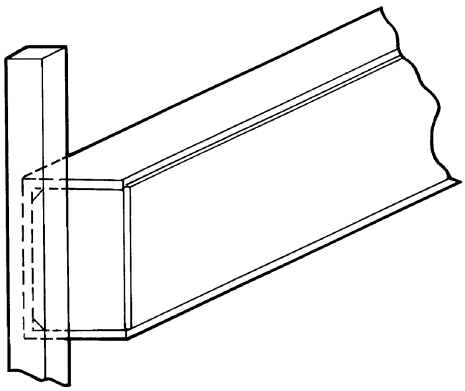


Figure 2.53

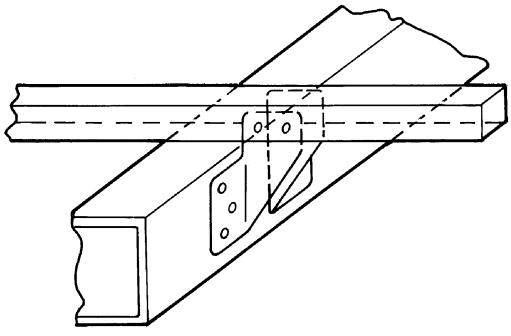
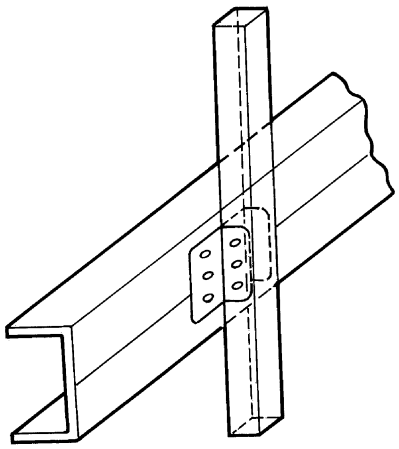


Figure 2.54



Consider the instructions in paragraphs 2.14 "Resistant structure material", 2.15 "Antirust body treatment" 2.5.4 "Technical welding requirements" during construction.

2.29 ADJUSTABLE DEVICES AND COVERS

No tie-rods or plates which may prevent easy access to the areas listed in paragraph 2.8.1 "Accessibility for maintenance" and the adjustable devices indicated in general standards must exist in the central structure and in the chassis anchoring points.

2.30 SYSTEM ASSEMBLY

All control wires, polyamide tubes and electrical wiring have adequate length to permit assembly along top of compartment and passage through the central structure.

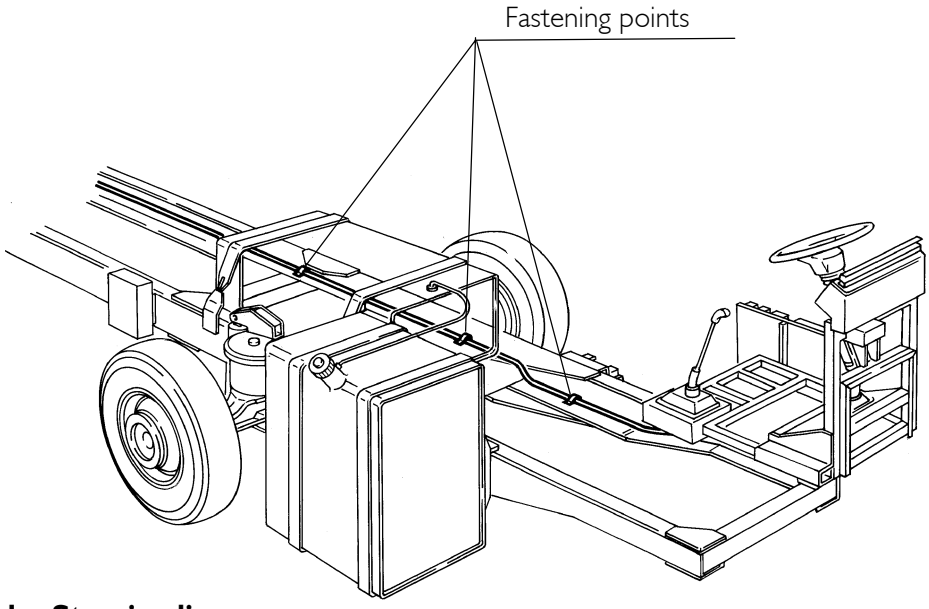
Fasten all with polyamide clips, shim and washer; IVECO references are:

41803081	Clip
8188348	Washer
42125406	Shim

Clip with rubber protection according to Standard IVECO EY 11-0760 may be used to tighten tubes or simple wires (all provided to outfitters).

The parts must be secured to the top of the compartment (by the side of the aisle under the passenger seat area) to ensure easy access with using pits or elevators, except for the clutch line which must be arranged as shown in paragraph 2.30.5 (see figure 2.55).

Figure 2.55



2.30.1 Steering lines

The line fitted on the chassis is suitable for the entire body and chassis.

If modular transformation is required, release the central sections of the pressure and return lines by loosening the fitted near the 4th and 7th cross-members.

The central area will be made by the outfitter to adapt to assembly of the upper part of the compartment

To do so, the removed tubes will be shaped and integrated with the tubes provided, ref. IVECO 9945 5943 diameter 15 x 12 and 9945 5942 diameter 19 x 22.

The provided tubes will be cut to the required length and connected by means of fittings according to IVECO EY 11-4203, EY 11-4301 and EY 11-4310 standards also provided.

2.30.2 Electrical system

Extend electrical wires. The length is sufficient to cross the compartment. Wrap the wires if in excess and fasten to the chassis so that they can be released from the rear.

Fit components ensuring that the terminals are well fastened to the respective elements.

Provide a compartment for housing the battery and disconnect device which must be protected from dust and moisture and ensure easy access to components.

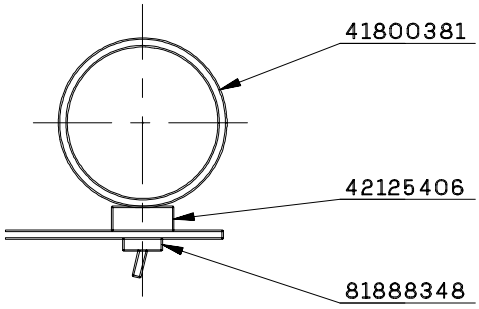
2.30.3 Pneumatic system

The polyamide tubes are long enough to ensure passage through the compartment.
The following minimum bending radius will be respected:

Tube Ø 9x12	Minimum radius 65 mm
Tube Ø 6x8	Minimum radius 45 mm

Hammer attachments are shown in detail in figure 2.56.

Figure 2.56



Flexion areas will be fastened to prevent vibration.

Check that no pipes are turned after assembly. Loose union fittings if required and tighten again after positioning the pipes correctly. Tighten according to the following table:

Nuts M 16 for 9x12 pipes	Torque 33± 2Nm
Nuts M12 for 6x8 pipes	Torque 23 ± 2Nm
Other union nuts	Torque 70 Nm

Check for leakage after tightening.

The same instructions apply to fuel lines (also made of polyamide material).

Pneumatic system assembly must be checked for leakage. Tightening specifications must be complied with for this purpose. The final system must present a maximum pressure drop not exceeding 0.2 bar/hour.

2.30.4 Fuel line

The same precautions will apply to fastenings and protections in the other "tecalan" systems. The line diameter and length must not be modified in any way because this would affect engine correct operation changing the results of electronically programmed parameters.

2.30.5 Clutch level line

The central area of the clutch lever line presents union fittings connecting the ends to facilitate disassembly before cutting the chassis. After assembly, the outfitter may increase the length of the line by adding sections provided to outfitters; connect using union fittings as per IVECO EY 11-4203, EY 11-4301 and EY 11-4310 standards.

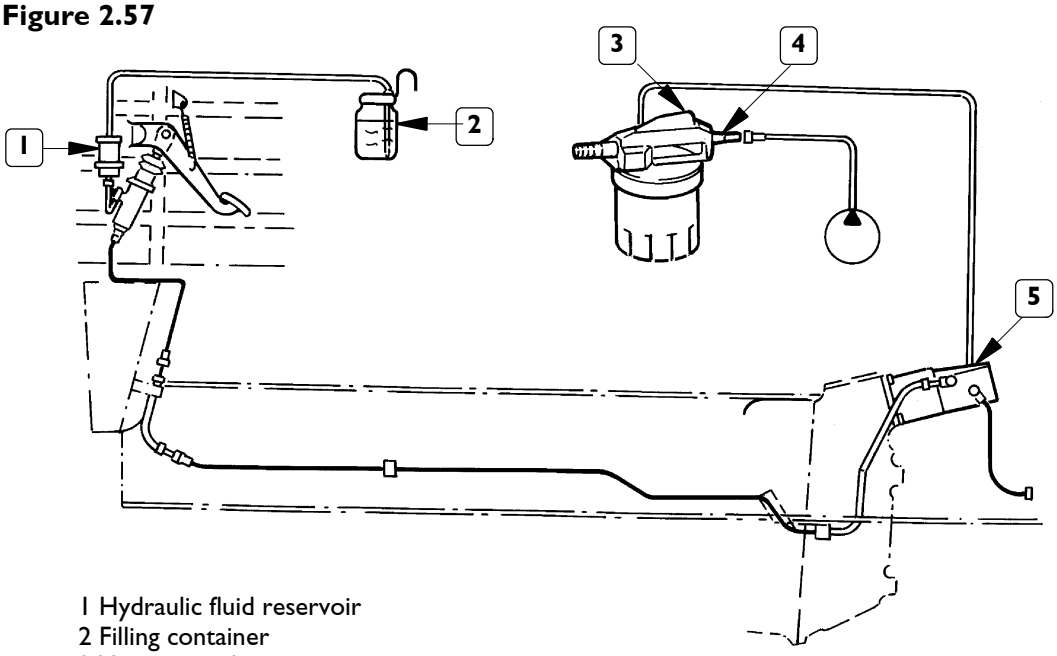
The clutch lever line must mandatorily pass in the lower part of the compartment, unlike the other lines, to ensure correct bleeding and clutch operation unless the line consists of a single part in the compartment area.

Bleed the system by vacuum using tool ref. ET 0071, as follows:

- 1) Connect a source of compressed air from 5.5 to 12 bars to clip-on fitting 4 on upper part of emptying equipment.
- 2) Remove hydraulic clutch reservoir cap 1 on vehicle, empty fluid and arrange the container 2 filled with clean clutch fluid to fill the reservoir.

- 3) Extract the bleeder screw, apply silicon grease to the screw and refit it.
- 4) Arrange rubber adapter into hydraulic-pneumatic cylinder breather 5.
- 5) Open the hydraulic-pneumatic cylinder bleeder screw by half a turn.
- 6) Press the lever on the upper part of the tool 3 to suck up the fluid. Note that air bubbles or foam will appear in the fluid seen through the transparent tube.
- 7) Close the bleeder screw when fluid without bubbles flows through the flexible tube.
- 8) Fluid should be present in the clutch reservoir during the entire operation.
- 9) Check clutch fluid level in the reservoir and press the clutch pedal repeatedly. It should be firm if all the air has been eliminated.
- 10) Check that regulations are correct before removing the bleeder tool from the clutch as shown in the respective Service Manual.
  Repeat the procedure from step 4 to 10 to ensure correct operation if this is not so.

Figure 2.57



1 Hydraulic fluid reservoir
2 Filling container
3 Vacuum tool
4 Clip-on fitting
5 Hydraulic-pneumatic cylinder bleeding procedure

Never reuse the fluid resulting from the bleeding procedure.

2.30.6 Gear lever wire handling procedure

Product the wires during body construction from burning or damage when working is nearby areas.

The vehicle is provided with gear control wire ref. IRISBUS 504020391 and training cable ref. IRISBUS 504012421 suitable for most body models.

Wire systems will follow straight courses and bends will be as wide as possible for modular body transformation. Excessive length (where relevant) will be corrected by means of wide radius curves distributed along the course of the compartment. Wires must pass through the lower part of the compartment.

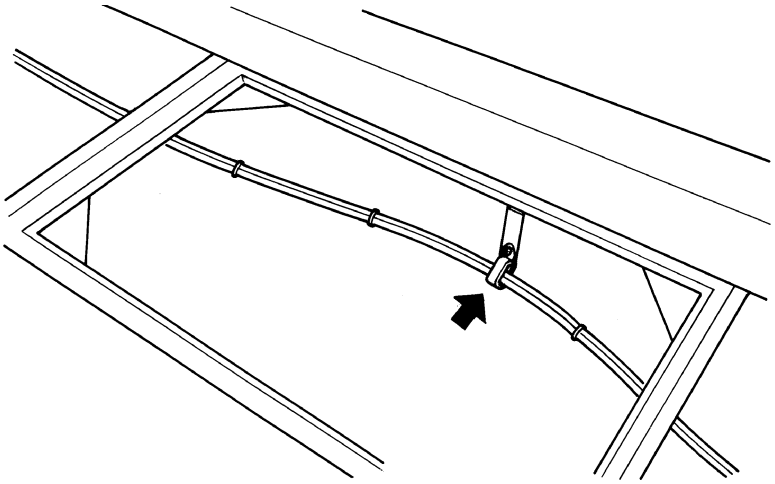
Minimum curve radius = 250 mm.

Maximum total angle = 400° (sum of all angles along the course).

Wires must pass through the lower part of the compartment. Wires will be gathered separately from the other of the tubes and wires to facilitate assembly, fastened to the chassis or to fixed parts, using clips like those described in paragraph 2.30 "System assembly". Do not squeeze the wire to prevent sliding of the core inside.

Wire should not hang in the areas between rest in the compartment and the gearbox or gear lever. Use fastening collars with rubber protections. If required, considering the distance of the wire from the closest section, use a tie-rod will clip fastened to the end to make the course as gradual as possible (see figure 2.58).

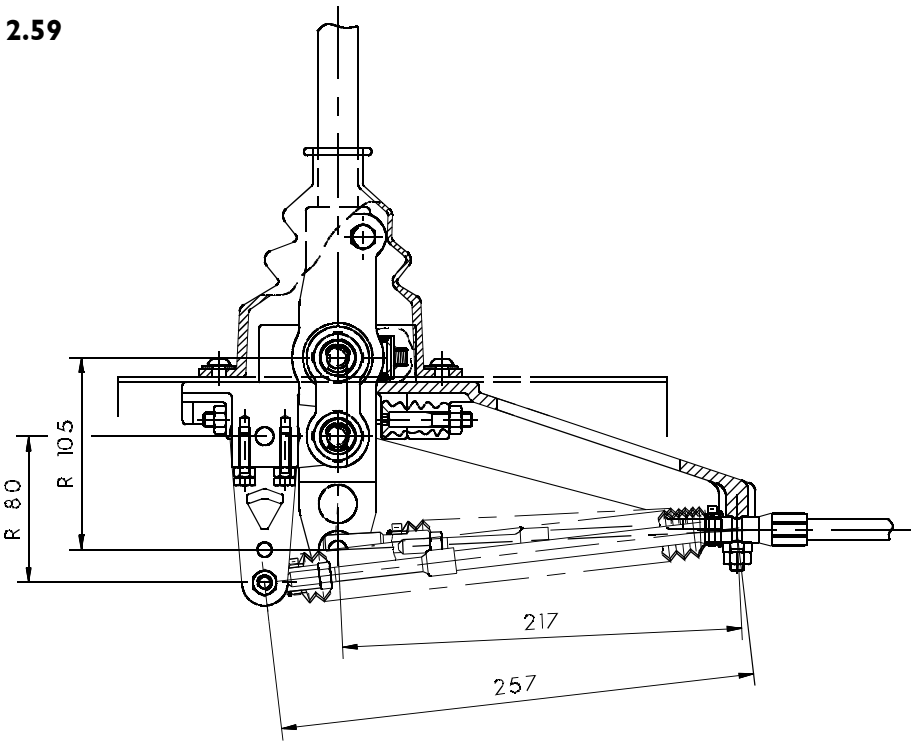
Figure 2.58



Adjust wires as follows after handling them for body construction:

- Arrange the gear lever in vertical position as shown in figure 2.59 (to ensure dimensions of 217±0.5 mm and 257±0.5 mm).

Figure 2.59



- Ensure length of 217±0.5 mm and 257±0.5 mm of wires in gearbox fastening area as shown in figures 2.60, 2.61 and 2.62. Modify the position of both joints if needed to obtain the required dimension (move the fastening support slide, if necessary).

Figure 2.60 (for types 397E.12.31 and 397E.12.35)

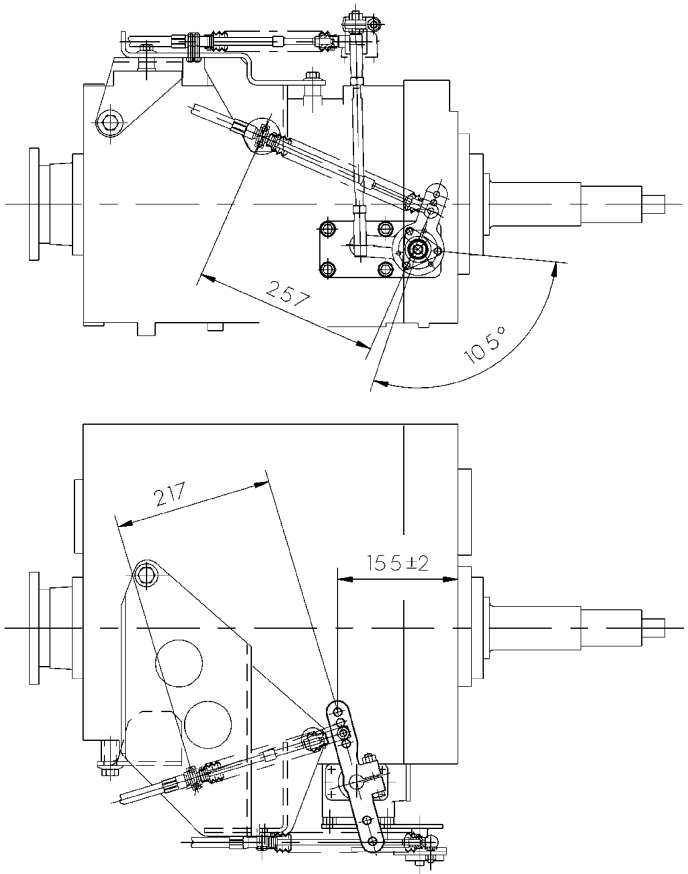


Figure 2.61 (for types 397E.12.43)

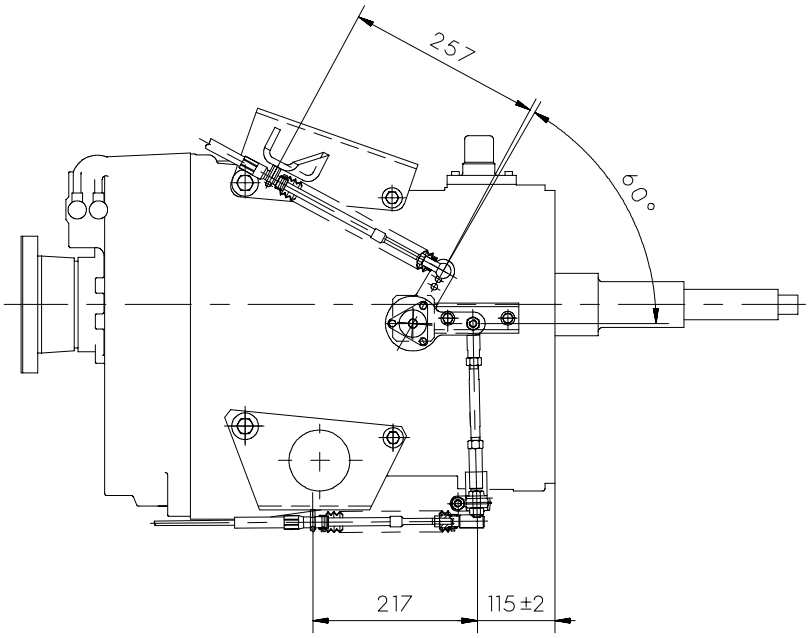
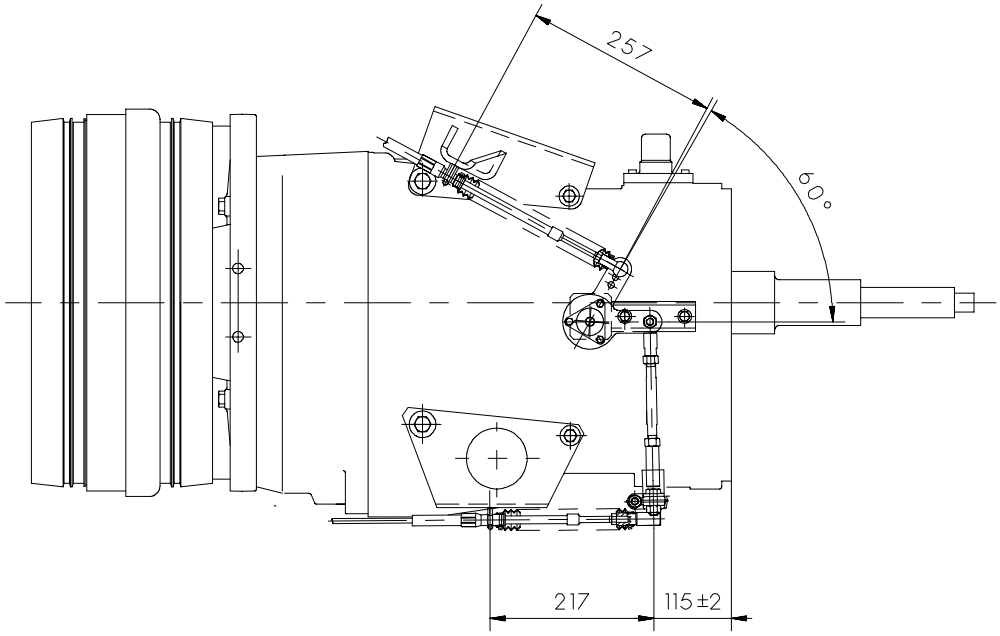


Figure 2.62 (for types 397E.12.43)



- After fitting the wires in the turret and checking that they are neither pulled nor twisted, carry out a final check by releasing the ends and ensuring that the two joints move in and out of the housing easily.

Excessive stiffness of the gear lever after this check may indicate that the wire is excessively tight. Repeat assembly and either loosen or replace clips which are excessively tight.

Contact IRISBUS After-Market Service if the problem persists.

2.31 ADJUSTING THE HEIGHT OF THE DRIVER'S SEAT

The height of the driver's seat can be raised or lowered.

2.31.1. Raising the driver's seat

The driver's seat can be raised in two different ways according to the height of position A.

The bracket stand IVECO reference 99445241 must be fastened as shown in figures 2.63 and 2.64 and turned by 180° with respect to the original position to lift to 100 mm.

Figure 2.63

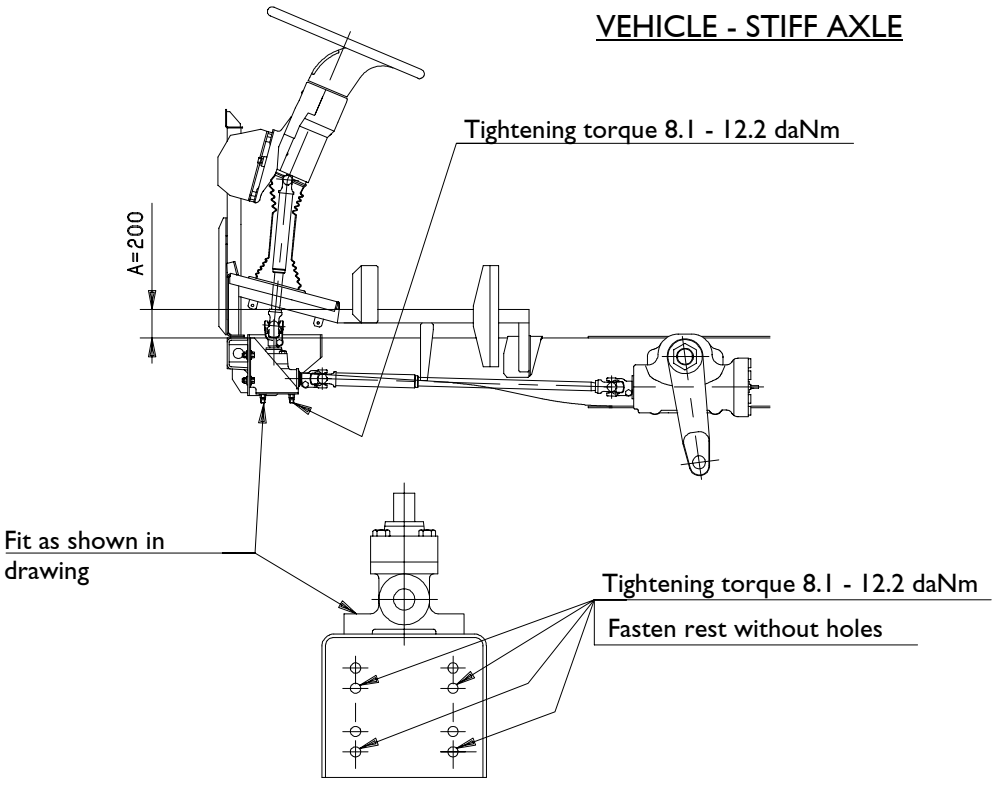
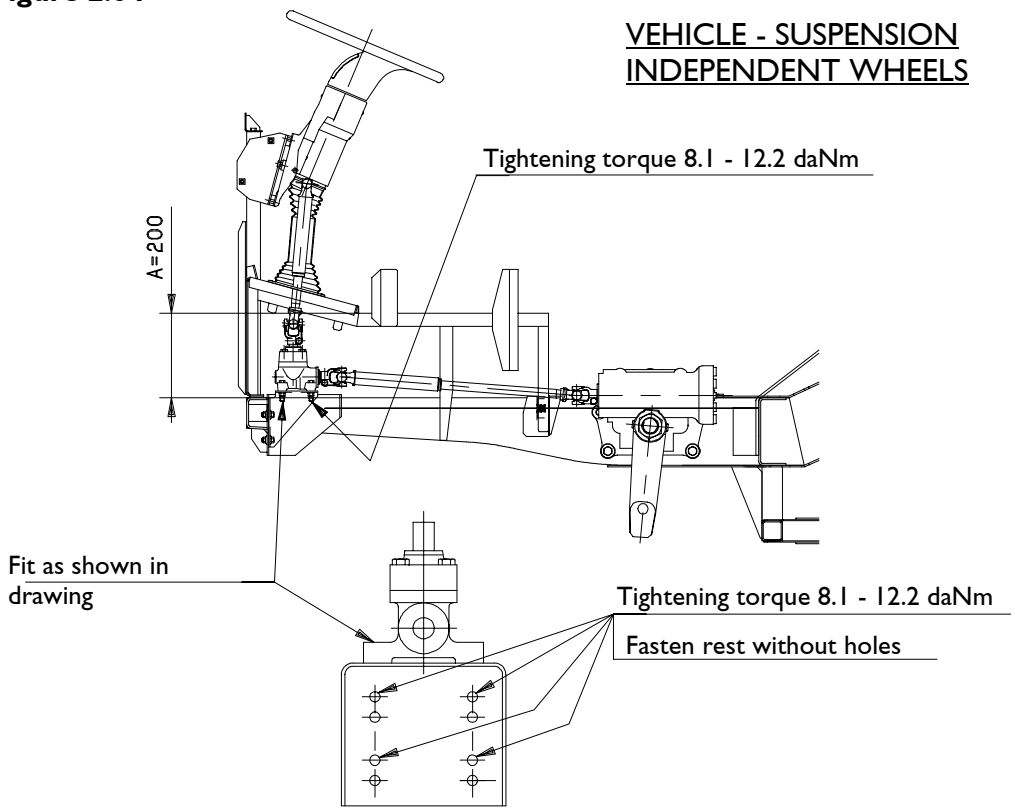

VEHICLE - STIFF AXLE
Tightening torque 8.1 - 12.2 daNm
A=200
Fit as shown in drawing
Tightening torque 8.1 - 12.2 daNm
Fasten rest without holes

Figure 2.64



Fasten rest 99445241 as shown in figures 2.65 and 2.66 to raise from 100 to 200 mm.

Figure 2.65

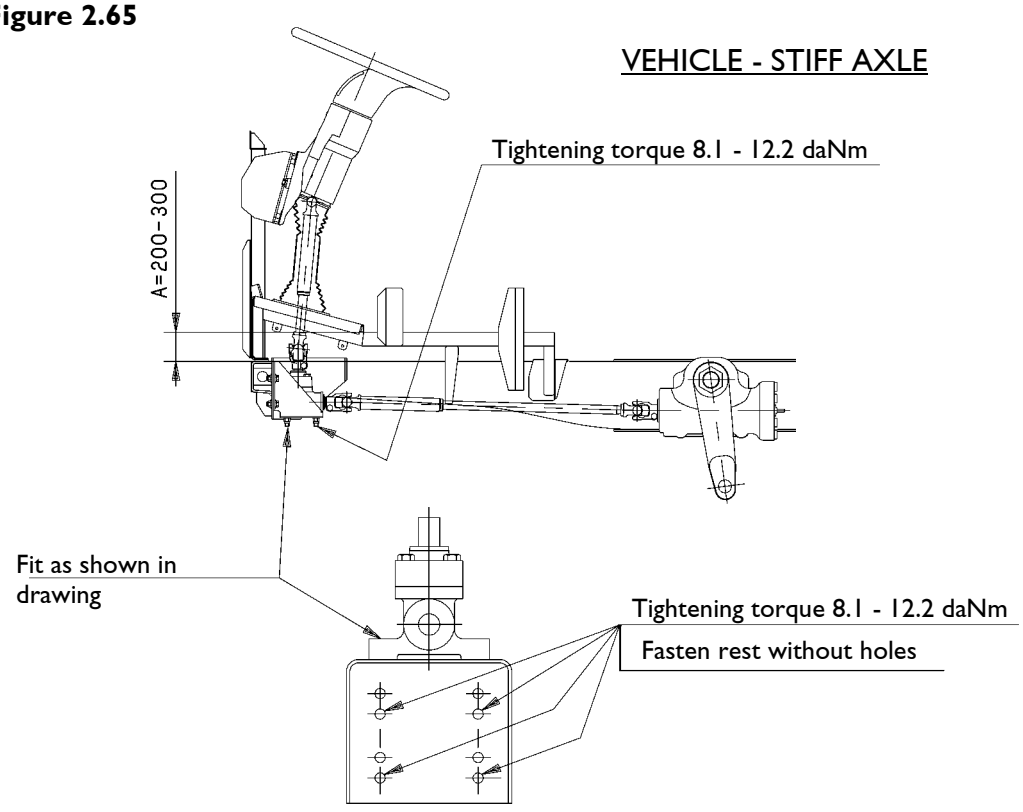
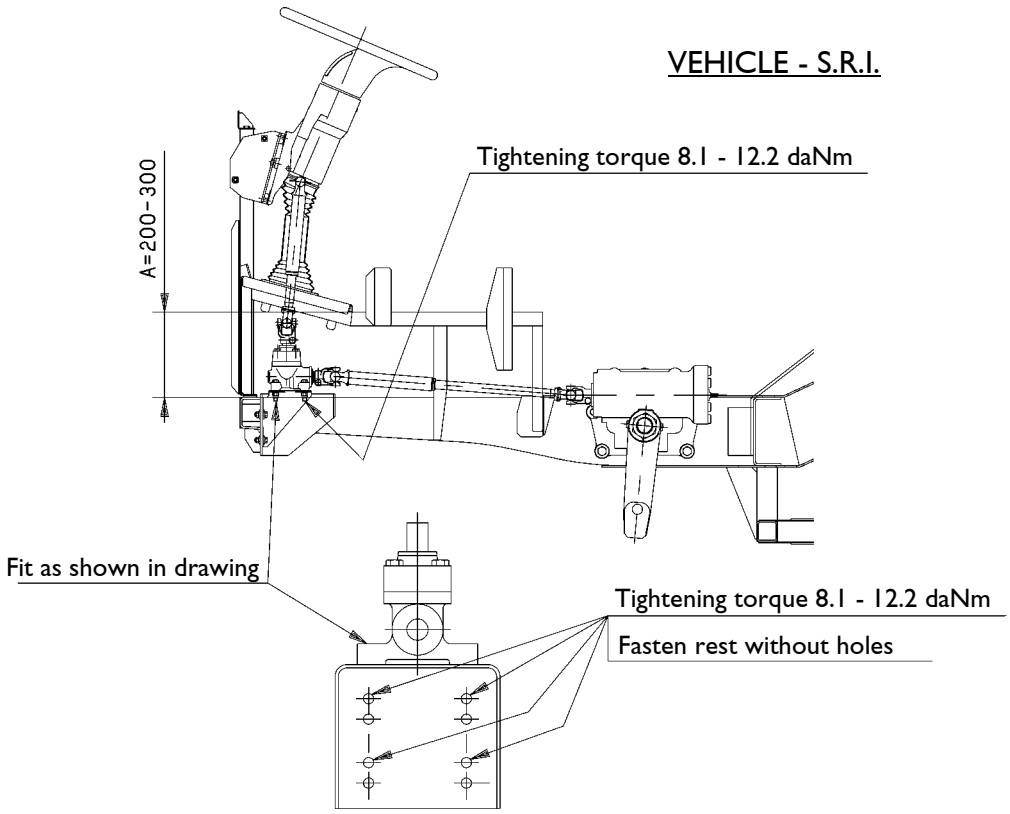


Figure 2.66


VEHICLE - S.R.I.
Tightening torque 8.1 - 12.2 daNm
A=200÷300
Fit as shown in drawing
Tightening torque 8.1 - 12.2 daNm
Fasten rest without holes

2.31.2 Lowering the driver's seat

Proceed as follows to lower the driver's seat to 200 mm:

1. Cut the chassis sidemembers to a minimum size of 1120 mm with respect to front axle.

2. Weld a 8 mm thick plate (reference 1) to cover the left sidemember section, as shown in figures 2.67 and 2.68. Repeat the operation on the right sidemember. The length of the plate will depend on height X. Recommended material Fe E 490.

See table of materials, chapter 4.

3. Weld the previously cut chassis section to the plates (reference 2) making sure the position is perfectly horizontal, parallel and aligned with the rest of the chassis.

4. Weld two connection nets (reference 3) on each side considering that the "S" section must be equivalent to the cross-section of the sidemember.

Alternatively, outfitters may build the driver's seat into the front armature of the body by connecting the cut sidemembers. Outfitters will be entirely responsible for drawing and construction in this case and shall consult IRISBUS Bus Quality Department for suitability of the proposed solution.

Welding must satisfy the specifications in paragraphs 2.5.4 "Technical welding requirements" and 2.5.5 "Spot welding".

Figure 2.67

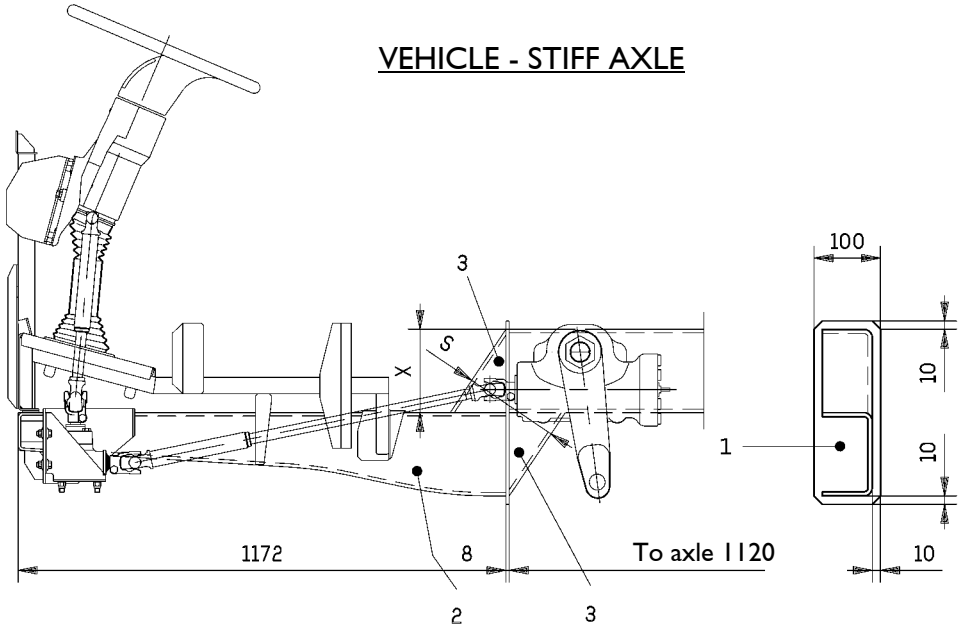
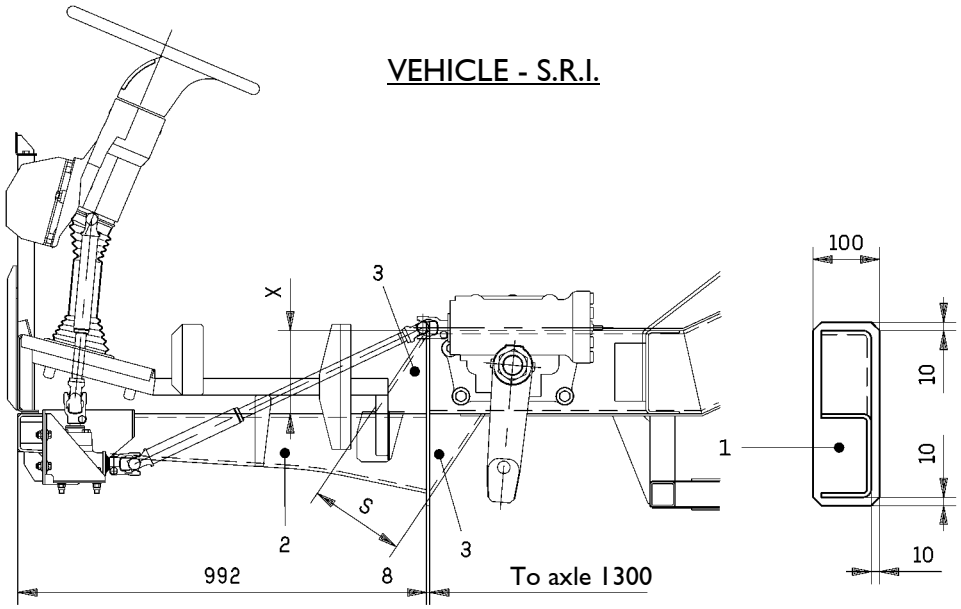


Figure 2.68



2.32 10.8 METRE VERSION

2.33 INDICATIONS AND DATA ON WEIGHTS AND SIZES

2.33.1 Weight table

Type	Chassis kerb weight (1)	Maximum technically admissible weight (2)	Maximum authorised weight (2)
397E.10.31/35-SRI			
Front axle	960	6700	6700
Rear axle	4820	12000	11500
Total	5780	18000	18000
397E.10.31/35A-SRI			
Front axle	990	6700	6700
Rear axle	4730	12000	11500
Total	5720	18000	18000

(1) Vehicle ex works, BOGIE version, 3000 mm wheelbase (with fuel, oil and fluids, batteries, spare tyre, without driver)

(2) Standard Spanish type-approved version.

2.33.2 Centre of gravity

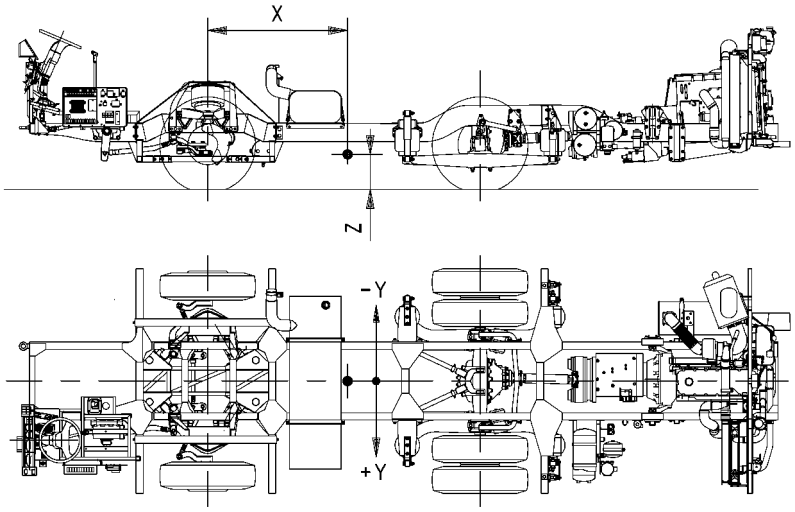
The chassis centre of gravity is shown in the following table for calculating centre of gravity in vehicles with body for type-approval according to Regulation 66/ECE.

Dimension X: Distance from front axle
Dimension Y: Distance from middle plane of the vehicle (+ right-hand side - left-hand side)
Dimension Z: Distance from ground

Data refer to the conditions illustrated in paragraphs 2.3.1 and 2.3.2, with standard tyres.

Type	X	Y	Z
397E.10.31/35-SRI	0000	0	000
397E.10.31/35A-SRI	0000	0	000

Figure 2.69



CENTRE OF GRAVITY DIMENSIONS X-Y-Z

2.33.3 Assembly measurements

Assembly measurement plan ratio for each vehicle type.

Type	Ref. IRISBUS
397E.10.31/35-SRI	50006301544 DL

2.34 MANUFACTURER'S IDENTIFICATION

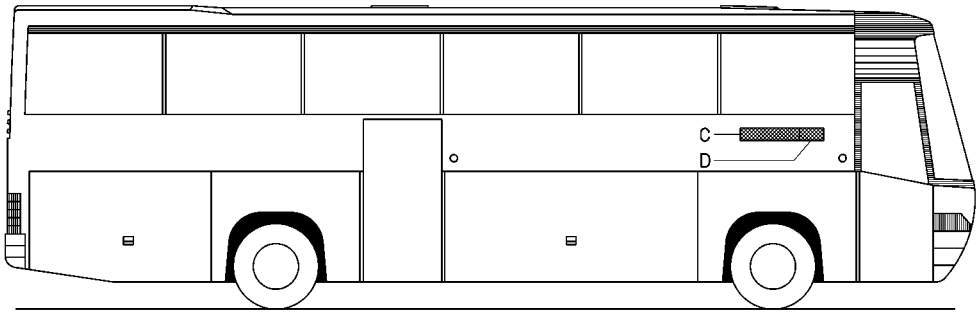
Side:

- C) Two "EuroRider" IVECO Ref 9945 4806 on each side of the vehicle under the first passenger window.
- D) See figure 2.71.

Examples of C and D sticker positioning: EuroRider C 31
EuroRider C 31.A
EuroRider C 31.A.SRI

See arrangement in figure 2.70.

Figure 2.70

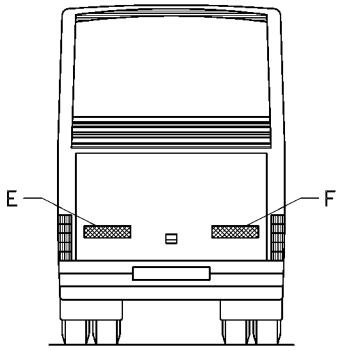


Rear:

- E) One "IRISBUS" emblem Ref. 5006210565 on left side.
- F) One "IVECO" emblem Ref. 500364642 on right side.

See arrangement in figure 2.71.

Figure 2.71



397E.10.31 A-C(BOGIE)SRI	"C-31"	5006300330	KZ
ZF S6-1600+TELMA	"SRI"	5006300340	KZ
397E.10.31 A-C(BOGIE)SRI	"A"	5006300345	KZ
ZF-5HP 502C	"C-31"	5006300330	KZ
	"SRI"	5006300340	KZ
397E.10.35 A-C(BOGIE)SRI	"C-35"	5006300335	KZ
ZF S6-1600+TELMA	"SRI"	5006300340	KZ
397E.10.35 A-C(BOGIE)SRI	"A"	5006300345	KZ
ZF-5HP 592C	"C-35"	5006300335	KZ
	"SRI"	5006300340	KZ
DELFINO IRISBUS		5006210564	EY
INITIALS IRISBUS		5006210565	EY

2.35 MANDATORY ARRANGEMENT

Outfitters must consider that the weight of the vehicle with body corresponds to approximately min. 30% of the total weight on the front axle in loaded and empty configuration.

Panel the front axle if required to satisfy this specification.

2.36 APPLICATION

The remaining points not described in paragraphs 2.32 and following refer to application, with the exception of paragraphs 2.31, 2.31.1 and 2.31.2 which refer to "ADJUSTING THE HEIGHT OF THE DRIVER'S SEAT".

3. PRODUCT COMPLIANCE (ELEMENTS SUBJECT TO REGULATION: EEC, ECE, etc.) TO BE REQUESTED TO BODY REPAIRERS AND THEIR CASCADE SUPPLIERS

Index

3	**PRODUCT COMPLIANCE (ELEMENTS SUBJECT TO REGULATION: EEC, ECE, ETC.) TO BE REQUESTED TO BODY REPAIRERS AND THEIR CASCADE SUPPLIERS**	**3-5**
3.1	TARGETS	3-5
3.2	SCOPE	3-5
3.3	DEFINITIONS	3-5
3.4	RELATIONSHIPS BETWEEN MANUFACTURER AND SUPPLIER	3-6
3.5	STRUCTURE OF THE PRODUCT COMPLIANCE CONTROL SYSTEM	3-6
3.5.1	General features	3-7
3.5.2	System organization, planning, checkouts and revisions	3-7
3.5.3	Documents	3-8
3.5.4	Registers	3-8
3.5.5	Corrective interventions	3-9
3.5.6	Project documentation control	3-9
3.5.7	Control, measuring and testing equipment checkout	3-9
3.5.8	Checkout procedures	3-10
3.5.9	Purchased product control	3-10
3.5.10	Controls during manufacturing	3-11
3.5.11	Final product checkout and testing	3-11
3.5.12	Non-compliance management	3-11
3.5.13	Product protection and storage	3-12
3.6	LIABILITIES BEFORE THIRD PARTIES	3-12
3.7	RULES FOR BODY REPAIRERS USING IRISBUS SAFETY PARTS	3-12
3.8	CERTIFICATE OF FITNESS FOR IRISBUS CHASSIS EQUIPMENT	3-13
3.9	CONDITIONS FOR APPROVING A THIRD PARTY BODY ON AN IRISBUS CHASSIS	3-16
3.9.1	Documents	3-16

3 PRODUCT COMPLIANCE (ELEMENTS SUBJECT TO REGULATION: EEC, ECE, etc.) TO BE REQUESTED TO BODY REPAIRERS AND THEIR CASCADE SUPPLIERS

3.1 TARGETS

This chapter defines and describes the Control System requirements during the production process, which are necessary to ensure the final product compliance (either complete vehicles, vehicle systems, components or technical units) as for matters subject to regulations (EEC regulations, Geneva/UNO/ECE Regulations, national laws, etc.).

3.2 SCOPE

The instructions contained in this chapter are applied during production process control of complete vehicles, components and technical units.

3.3 DEFINITIONS

In this chapter the following terms are so defined:

- Final product: the result of the production process, which must fully comply with the requirements defined by law (at various levels: Local Government/ Self-governing body/State/European Union, etc.); this applies to either complete vehicles, components or technical units.
- Vehicle systems: any vehicle system, for example braking system, subject to regulations.
- Component: device to be supplied with a vehicle, for example warning horns, and subject to any regulation according to which it can or must be approved independently of the vehicle.
- Technical unit: device subject to statutory provisions, whose function is to be part of a vehicle; it can be separately approved, but only for one or more vehicle models specified in the "technical unit" approval.
- Maker (Manufacturer): the person or body liable, before the approval body, for all concerning the approval procedure, and the subject charged with production compliance.
- Supplier: any natural or legal person, body or organization from which the manufacturer purchases "not final" products and which can affect in some way the "final product" manufacture compliance.
- Legislation/Regulation: the technical requirements required and defined according to the various EEC, ECE, national regulations, etc.
- Production compliance control system: the set of procedures adopted by the manufacturer, correctly registered and retained, to ensure and prove that the product fully complies with the applicable law.
  The system includes organization, procedures, methods and tools provided by the manufacturer to ensure the final product compliance.

3.4 RELATIONSHIPS BETWEEN MANUFACTURER AND SUPPLIER

Considering that the manufacturer is fully liable for the control process on components and technical units compliance with the related requirements, the relationships with the suppliers can be included in one of the following categories, according to the adopted contractual provisions:

a) Planning, project development, experimentation, industrial systems, production, testing and shipment.

b) Industrial systems, testing and shipment.

c) Production, testing and shipment.

In order to ensure the final product compliance, the manufacturer will require a) and b) group suppliers to prove and properly implement their own Production Compliance Control System; a similar system will be requested of c) group suppliers or the manufacturer will directly check the products.

For each of the above groups, the System required by the manufacturer to the supplier shall cover either a), b) or c) supply category, as per contract.

3.5 STRUCTURE OF THE PRODUCT COMPLIANCE CONTROL SYSTEM

The system is composed of the following items:

- General features.
- System organization, planning, checkouts and revisions.
- Documents.
- Registers.
- Corrective interventions.
- Project documentation control.
- Control equipment checkout.
- Testing/approval procedure.
- Purchased product control.
- Checks during manufacturing.
- Final product checkouts and tests.
- Non-compliance management.
- Product protection and storage.

NOTE: As for b) and c) groups, at 3.4 item, the "Project documentation control" item and information contained in other items and concerning the project will be omitted.

3.5.1 General features

The manufacturer shall define, register and update his own System, according to the production features and order of priority, to ensure and prove the product compliance with the related requirements, both if an in-house processing procedure has been experimented and if the system has been partly supplied by external suppliers.

In the latter case, the manufacturer may compare it to the System adopted by his own suppliers according to 3.4 item.

The system must include all provisions listed at paragraph 3. However, development ranges, implementation and tools can vary according to the product types and size, the organization structure followed by the manufacturer, existing automation types and degrees.

The manufacturer is liable for the overall System procedures (thus, we used the term “cascade”).

Since the tools used to manage and transmit information are continuously in development because of new methods, each procedure must be meant and valued on the basis of the result to be obtained, not according to the method used to obtain it.

3.5.2 System organization, planning, checkouts and revisions

1) System Organization

   The manufacturer shall define its own System, such as the involved functions suitably comply with the provisions given in this chapter, in order to ensure the product fully complies with the related regulations.

2) Training

   The manufacturer shall define the training requirements of the personnel involved in the production process and in the relevant control system.

3) System planning

   - Project and manufacturing documentation control.
   - Technical project identification and acquisition.
   - Personnel training.
   - Tool checkout and testing techniques updating, if needed.
   - Testing procedure definition and diffusion.
   - Quality control programs, if foreseen by the related requirements.

4) System checkout and revision

The manufacturer shall perform periodical checks to the implemented system, adopting techniques best suiting his organization, in order to:

- Verify the system effectiveness, according to the estimated results.
- Detect any fault/inconsistency in all checked System sections.
- Find out missing items.
- Check for the corrective intervention procedures effectiveness.

3.5.3 Documents

The documents shall support the work development through planning, production, testing and shipment stages. As concerning the legislation/regulation in force, the documents can include:

- Projects.
- Rules and procedures.
- Product and/or project changes.
- Test and acceptance procedures for supplies.
- Production process control programs.
- Product control, repairing and rejecting procedures.
- Tools, gauges and equipment periodic checkout procedures.
- Storage, packing and shipment instructions.
- Registration and filing procedures of the production process control results.
- Evidence management instructions (if any).

However, information supplied by means of computer-aided techniques are applicable, even if the final target is to provide the necessary documents to the right persons and at the right moment, and/or needed for.

3.5.4 Registers

The manufacturer shall fill-in and retain the registers provided for by his system in order to prove the actual compliance and the control System effectiveness.

Moreover, the manufacturer shall ensure that products supplied by any supplier are in compliance with the necessary requirements. To do this the manufacturer can avail himself of the registers compiled by his own suppliers, following the procedures and methods previously agreed on.

The registers shall be retained and kept available at least up to the date set by 224 Law of 24/05/88 (EEC Regulation in force). The registers compiled by any supplier are included in this data group.

The registers shall include, at least:

- Plain identification of each element and group they are composed of, in compliance with the necessary requirements.
- Moreover, according to circumstances, the type and number of performed checkouts, accepted and rejected amounts and the nature of any adopted corrective intervention.

Besides data relevant to the control system checkouts, the registers shall also include those relevant to testing and measuring equipment adjustment.

3.5.5 Corrective interventions

The manufacturer must define and keep efficient all documented procedures allowing him to detect any non-compliance causes through all stages from the product purchase to the final product sale and able to possibly affecting planning, procurement, manufacturing, tests and any other element/function which could change the final product compliance with the necessary requirements, according to the legislation/regulation in force.

In particolare il fabbricante dovrà:

- Select useful information to find out non-compliance causes and start the necessary corrective interventions.
- Monitor manufacturing processes and working procedures, as well as check the registers, to eliminate all final product non-compliance causes.
- Start the suitable interventions, following any non-complying item.
- Check the corrective interventions effectiveness.

3.5.6 Project documentation control

The manufacturer system shall ensure overall control on the project.

If applicable, the above mentioned provisions shall include:

- Identification of the activities considered as involved in the project by the administration.
- Liability for the projects and/or relevant rules and/or procedures.
- Instructions to comply with the necessary requirements.
- Project revision procedures, to ensure the final product compliance.

3.5.7 Control, measuring and testing equipment checkout

The manufacturer shall provide specific procedures to locate, control, adjust and keep efficient all measuring and testing equipment, which will prove the final product compliance with the necessary requirements.

These procedures shall be checked as for the related response, as well as to verify their effectiveness, both following a preset maintenance schedule and by means of extraordinary interventions if necessary.

The measuring tools accuracy shall be checked at regular intervals and compared to reference patterns.

The periodic checkout results shall be retained, so to always be easily available.

3.5.8 Checkout procedures

The manufacturer shall define and register the checkout procedures adopted. Similar procedures shall be used by suppliers dealing with compliance control.

Both checkout procedures based on statistic methods and test results shall be suitably registered and valued, in order to assess fault and all significant reject causes and start the necessary corrective interventions on the product and/or manufacturing process.

The manufacturer shall define and keep efficient a system identifying the product testing conditions.

The manufacturer shall mark all not complying products, using suitable identification techniques, namely stamps, labels, tags, etc.

3.5.9 Purchased product control

According to what provided at 3.4 item, the manufacturer must ensure the purchased products fully comply with the necessary requirements.

Supply sources and control methods will be chosen according to the product type and the supplier capacities. The manufacturer shall therefore prepare a list of selected and qualified suppliers.

The compliance of purchased products shall be proven by means of the following:
(for a) and b) group supplier products),

- "a priori" effectiveness of the proprietary Compliance Control System, which includes cascade suppliers.
- Proper use of the system.
- Manufacturer checkouts performed by the manufacturer according to what provided at 3.5.2 item for in-house checkouts.
- Direct statistic controls on the supplies performed, performed by the manufacturer (for c) group supplier products, as an alternative)
- As for a) and b) groups or simply by means of direct statistic controls performed by the manufacturer on the supplies.
- By means of direct statistic controls on the supplies performed by the manufacturer.

The manufacturer buy order shall include a technical description of the required product and the data needed by the supplier to check for compliance.

Faulty products coming from the suppliers, delivered at the manufacturer's premises, must undergo the same procedures followed for faulty products detected in-house.

The manufacturer shall ensure the supplied product compliance as per the "supply contract" or make the supplier carry out compliance control, according to the system adopted by the latter.

3.5.10 Controls during manufacturing

The manufacturer shall ensure that manufacturing processes are performed under close control, to ensure the Product Compliance with the necessary requirements. The control must be based on documented working instructions, defining control equipment to be used and methods to be applied.

The manufacturer must ensure that production rules, projects and/or any other necessary technical data are made available to whoever needs them; these data must always be updated.

The manufacturer must perform the necessary checkouts to ensure the product compliance with the necessary requirements. These checkouts can be performed by means of processing survey automatic controls or by means of product test performed with suitable equipment and qualified personnel (for example: self-control).

The checkout and control methods adopted by the manufacturer must be quickly enhanced if resulting unsuitable; the procedures defined by the manufacturer shall name the body or person liable for the processing and control rules issue, checkout and modification.

The working instructions defined by the manufacturer and duly registered shall include all manufacturing stages which could affect the product compliance with the necessary requirements, assembly and installation included.

Moreover, the control methods must be specified.

3.5.11 Final product checkout and testing

The manufacturer, to prove the final product compliance (single elements or whole production lot) with the necessary requirements, shall define the checking procedures.

The manufacturer shall consider the following factors: testing procedures and involved personnel, testing equipment (accuracy and fitness), testing conditions and data to be registered. The manufacturer System shall ensure that all materials, parts and subsets are in compliance with the requirements before their assembly. This because, once assembled and built-in in the final product, accessing and monitoring could result difficult.

3.5.12 Non-compliance management

The manufacturer shall define and keep efficient the compulsory intervention management procedures in case of non-compliance.

These procedures shall include operations to be carried out to identify, locate and work on non-compliance parts. Non-compliances shall be suitably labeled to avoid using or shipping not complying final products.

Moreover, it is recommended to suitably retain the related registers, which shall report the non-compliance nature and extent, as well as the adopted remedies.

3.5.13 Product protection and storage

The manufacturer must define and keep efficient a system to identify, store, group and handle products, starting from the arrival and through the whole production process. This System shall define product management methods to avoid faults, improper use and deterioration, as well as provide suitable information concerning single elements and subsets handling and stocking. Moreover, the system shall ensure that the defined procedures are actually carried out.

Suppliers must comply with these requirements, ensuring a similar check on materials and final product protection.

3.6 LIABILITIES BEFORE THIRD PARTIES

If, when the bus equipped by an external Body maker on IRISBUS chassis is in transit, with passengers on board, or during a modification carried out by an external Body maker, on behalf of himself or of IRISBUS , an accident or unpredictable event occurs resulting in casualties or damages, the Body maker shall be held liable. This in case the damage survey or inquiry prove that it was due to body faults (design and/or manufacturing) and/or changes made on the chassis which were neither agreed on nor authorized by IRISBUS, or irrespective of the rules or recommendations included in this chapter.

In this case the Body maker can not recover from IRISBUS , as for claims/actions started by third parties or expenses borne by IRISBUS must in connection with or in consequence of these actions or claims.

Therefore, the Body maker shall draw a (Product liability) insurance, whose terms and conditions will be defined according to the above criteria.

3.7 RULES FOR BODY REPAIRERS USING IRISBUS SAFETY PARTS

Constantly striving to achieve higher safety standards and in view of the specific regulation enforcement within the European Union, IRISBUS has drafted a regulation concerning safety parts.

It deals with vehicle components, elements and parts on whose safety the driver's and third parties' durable safety directly depends.

The safety part drawing must be marked with the letter "S".

In the drawing all levels, features, notes, materials, etc. corresponding to project critical elements must be marked with asterisks.

Work orders for "S" parts shall be delivered to Body repairers as soon as the presence of equipment, machines and control organization able to grant the required reliability is ascertained.

The procedure for "S" parts, with which the Body maker shall comply, is as follows:

1) Compulsory compliance with safety features.

2) Ten year retention of all the documents reporting the tests performed on safety features.

3) Notice of faults detected as for critical features; the form is given at page no. 3-14.

4) Notice of parts and/or components modification proposals, as for materials, processing and testing; the form is given at page no. 3-14.

5) Delivery, for each lot sent, of the product identification quality certificate, according to no. 0103 IRISBUS specification.

6) Written statement, by the Body maker, attesting the acceptance of all provisions given at 1, 2, 3, 4 and 5 items; the form is given at page no. 3-15.

After acceptance of the above mentioned items, the Body maker shall allow IRISBUS , if needed or reasonably requested, to survey, at any time, his safety product control system effectiveness. IRISBUS will classify the DRAWING-DENOMINATION.

3.8 CERTIFICATE OF FITNESS FOR IRISBUS CHASSIS EQUIPMENT

IRISBUS

The company (business name and address) asks for the issue of the Certificate of Fitness, authorizing the .....model chassis equipment, as well as approval of the enclosed drawing copies no.....

From this moment it is engaged to:

- Equip the chassis work-manlike.
- Comply with the limits and provisions, as for masses provided for the model.
- Carry out no modification on the chassis as delivered by the shop.
- Duly assemble the body structure with the frame provided by IRISBUS (which is not load bearing), carefully performing frame seams.
- Be liable, before its clients, for the body as well as faults resulting from improper equipment (such as frame failure) and for all possible consequence.

Particularly, as for the current chassis, we state the related diagram has been received and surveyed, namely:

- Drawing..... Sheet 1/3 overall view
  Drawing..... Sheet 2/3 provisions
  Drawing..... Sheet 3/3

and we will thoroughly follow the instructions given, in compliance with generic IRISBUS equipment regulation.

As for body strength specific requirements, within the overall structure, we state suitable calculation and/or testing shall be provided for all implementations, which shall be suitably registered and retained, on our liability.

As for the acceptance of our structural drawings, for approval purposes, it is understood that, in the event your theoretical and/or practical checkouts prove unfeasible, due to economic or technical reasons, we shall be fully liable for the project development and implementation, dimensioning and materials included.

Safety parts
Notice of "S" parts faults

Our Company (business name and address) has detected the part (reference number-denomination) non-compliance with one of the safety specifications.

The lot containing faulty parts is possibly composed of no . . parts, of which about no . . parts are faulty and has been manufactured between . . . . . and . . . . . .

This fault has been due to : . . . . . .

It could be corrected by means of the following actions: . . . . . .
. . . . . .

Date . . . . . .

Supplier stamp and sign

Safety parts
Modification request

Our company (business name and address) has detected enough reasons to request the following modification of the part (reference number-description), belonging to the group . . .

for the following purposes . . . . . .
. . . . . .

To carry out the modification, the following actions are recommended:

- Planning (if the group has been designed by the supplier)
  . . . . . .
- Processing . . . . . .
- Equipment . . . . . .
- Machinery . . . . . .
- Test cycles . . . . . .
- Testing equipment . . . . . .

Time required for the modification: . . . . . .

Date . . . . . .

Supplier stamp and sign

Safety parts
Retention of documents obligation

Our Company (business name and address) as the supplier of the part (reference number-denomination), undertakes to retain for 10 years all documents relevant to the above mentioned parts.

THESE DOCUMENTS SHALL INCLUDE:

- Work orders and amendments.
- Test sheets, checkouts and subsequent rules attesting the product quality. These sheets shall expressly refer to the single part or lot (specifying the relevant date), according to quality regulations.
- Modification requests as for processing, testing or drawings of parts belonging to a group.
- Notice of defects of workmanship detected on "S" parts.
- Modifications performed on "S" parts on our request.

These documents must always be made available in the event of surveys, also if the safety part has been manufactured by one of our subsuppliers.

Date . . . . . .

Supplier stamp and sign

3.9 CONDITIONS FOR APPROVING A THIRD PARTY BODY ON AN IRISBUS CHASSIS

When the body is ordered directly by IRISBUS, this shall be of the homologated type and, thus, the body-maker shall deliver the documentation specified below in addition to the results of the calculations and tests that justify the suitability of the body.

3.9.1 Documents

3.9.1.1 Description of the body
The body-maker shall deliver the descriptive documentation of the body that shall at least include the following:

3.9.1.1.1 Views of the external part of the body. Side, front and rear views.

3.9.1.1.2 Internal distribution, height from the floor, levels, capacity.

3.9.1.1.3 Materials used in manufacturing, treatments and superficial coverings.

3.9.1.1.4 List of the parts coming from the supplier that are incorporated in the body.

3.9.1.1.5 Type, characteristics and flow rate of the air conditioning system.

3.9.1.1.6 Type, characteristics and flow rate of the defogging and heating systems.

3.9.1.2 Weights.
The body-maker shall supply the specific distribution of the weights of the body, specifying the following:

3.9.1.2.1 Position of the masses of the body.

3.9.1.2.2 Position of the load of the passengers and of the luggage

3.9.1.2.3 Distribution of the load by axle in tare load and maximum load

3.9.1.2.4 Position of the centre of gravity of the vehicle in tare load and maximum load

3.9.1.3 Soundproofing.
This shall be sufficient to achieve the external and internal noise levels specified in points 2.5 and 2.6.
The insulating material shall include, in the part facing the engine, a covering suitable to repel the oil or fuel; all the materials shall be fire retardant. The body-maker shall supply the description of the placement of the soundproofing material and the characteristics of the materials.

3.9.1.4 Thermic insulation.
This shall be adequate to maintain a maximum temperature of 45°C in the internal part of the dividing wall between the passenger compartment and the engine compartment. The body-maker shall provide information on the placement and the characteristics of the materials. The thermal insulation shall respect the same conditions of fire retardantness required for the soundproofing material.

3.9.1.5 Life of the materials.
The body-maker shall supply all the information concerning the life of the parts specified in point 1.1.4. The supplied data shall be obtained following testing carried out in laboratories of the supplier of the component in question or in other suitably equipped laboratories. A copy of the documentation specifying the conditions and the results of the tests shall always be enclosed, so that these may be reproduced if necessary.

3.9.1.6 Documentation for the customer.
The body-maker shall supply a copy of the Spare Parts handbook and a copy of the Operation and Maintenance Handbook.

3.9.1.7 Calculations of the dimensions of the structure.
The body-maker shall supply the results of the calculations of the stresses using the Finite Element method obtained in the calculation hypotheses that were used as standard. The values of the load hypothesis shall be indicated in the calculation report. The calculated values shall be further convalidated through tests with extensiometric calipers.

3.9.1.8 Painting and rust-proofing.
The body-maker shall supply information on painting and general rust-proofing protection, specifying the duration of the effectiveness of said protection obtained in the salt spray fog tests.

3.9.1.9 Description of the heating system.
The body-maker shall specify the type and the flow rate of its parts, specifically: heaters, defogger, preheater, dimensions of the piping, flow rate, heating capacity etc.

3.9.1.10 Specific documentation for CNG versions. The body-maker shall supply a written statement that specifies that the body was made in the CNG versions. This statement shall include the following:

1) Description and dimensional justification of the resistance of the structure where the tanks of compressed gas are secured.

2) Commitment statement to observe the dispositions concerning the fastening of the tank to the vehicle.

3) Commitment statement to observe the dispositions concerning the gas system.

3.9.2 Tests.

3.9.2.1 Cooling.
Two measurements shall be required. These are: firstly, the load concerning the maximum torque and, secondly, the load of maximum power (the latter shall be measured at a speed of less than 100 rpm with respect to the speed corresponding to the maximum power)

This test shall be carried out on a roller stand with a capacity adequate to absorb the power generated by the engine; we recommend it is carried out in a laboratory that has adequate experience and equipment.

Before carrying out the other measurements, check the reading of the data of the roller stand to make sure that the torque and the power supplied correspond to the nominal ones of the engine; whenever the nominal values are not reached, inspect the vehicle and the engine in order to resolve any present defects.

The following shall be measured:

Ambient temperature of the air entering the radiator grill
Ambient temperature of the air entering the suction filter
Temperature of the water entering the radiator
Temperature of the water exiting the radiator
Temperature of the engine oil, measured in the inlet of the level rod
Engine rpm

Preparing the vehicle:

Viscous clutch of the fan in fixed position
Thermostats completely open
By pass completely closed

ATB=106°C - T. water entering radiator + T. air entering grill

Minimum values of ATB:

40°C for vehicles running in temperate areas

50°C for vehicles in tropical areas

55°C for vehicles in desert areas

3.9.2.2 Temperature of the engine compartment.
The test shall be performed at the same time as the measurements specified in 3.9.2.1 The temperatures shall be measured in the following points:

Elastic supports for supporting the front of the engine, right and left.

Elastic supports for supporting the rear of the engine, right and left.

Compressor pipe feeding the engine.

The measured temperature shall not be greater than 85°C.

3.9.2.3 Temperature of the engine insulation:
The test shall be carried out at the same time as the measurements specified in point 3.9.2.1 Measure the temperature in the interior side of the vehicle, at the separation with the engine compartment. The temperature shall not be greater than 45°C.

3.9.2.4 Suction pressure of the engine air.
The test shall be carried out at the same time as the measurements described in point 3.9.2.1 The maximum value of the fall of pressure, measured at the inlet of the filter, shall equal 100 mm of a column of water.

3.9.2.5 External noise levels.
The measurements shall be carried out according to the EEC Directives 70/157*96/020. The maximum acceptable value equals 80 + 1 dBA.

3.9.2.6 Internal noise.
The measurements shall be carried out according to Standard ISO 5128, in the following conditions:

Vehicle with manual gearbox: measure at 60, 80 and 100 km/h in the second-last gear; repeat the measurement at 80 and 100 km/h in the top gear.

Vehicle with automatic transmission: measure at 40, 60, 80 and 100 km/h with letter D.

Position of the sonometers: One in the middle of the last row of seats at the height of the ear of the passenger, and one in the position of the ear of the driver.

Maximum values: 72 dBA for tourism-type bodies and 74 dBA for urban or suburban bodies. These values may be increased by 2 dBA if the measurements are made with the air conditioning on at top speed.

3.9.2.7 Speed of the air on the windscreen.
On 80% of the surface of the windscreen the speed of the air shall be at least 1 m/sec.

3.9.2.8 Measuring the stresses for extensiometry.
In order to check the results of the calculations described in point 3.9.1.7, some stress measurements shall be made by subjecting the vehicle to stresses that reproduce all the load states used in calculation. The extensiometric calipers shall be placed in the points and in the directions that in the previous calculation indicated the highest values; their number shall not be less than 16 and the distribution shall be representative of the whole of the structure. The body-maker shall modify the structure whenever the result of these tests makes it recommendable and partially or totally repeat the tests if this is necessary, until reaching a stress level corresponding to a sufficient duration.

3.9.2.9 Internal vibrations.
The measurements shall not be carried out when the vehicle is stopped and with the engine idling. An accelerometer shall be fitted on the floor on the side of the driver's seat and another on the floor above the rear axle. The maximum value shall not exceed 0.7 m/sec^2.

3.9.2.10 Air conditioning.
When the vehicle is empty, closed with the air conditioning working on maximum power, and placed in a place with a minimum temperature of 40°C, there shall be a maintainable difference of 15°C between the external and the internal temperatures. The internal temperature shall be measured at a height of 1.5 m from the floor and in the hottest point. The temperature difference between the average measured in the previous testing conditions and any other point shall not exceed 2° C. The maximum velocity of the measured air conditioning in any point that could be occupied by a passenger shall not be greater than 0.5 m/sec.

3.9.2.11 Sealing of the body.
The vehicle, with all its openings completely closed (doors, boot, etc.), shall be subjected to, using adequate equipment, a rain with a flow rate of 150 mm/h distributed uniformly and directly perpendicular to the surface of the vehicle (vertical jets in the area of the roof and horizontal jets on the sides, at the front and at the rear).

The vehicle shall be maintained in the above conditions for a period of 15 minutes. When this period has elapsed, it shall travel for 1 km at least. When this is accomplished, inspect it carefully to make sure that no water has penetrated the inside. Only minor infiltrations are acceptable in the openings of the doors.

3.9.2.12 Draining the water with the suction system.
In the measuring conditions described in point 3.9.2.4, a jet shall be applied with a flow rate of 6 litres/min. This shall be directed vertically, distributed uniformly and placed immediately near the suction grill of the engine at the same speed of maximum power for 3 minutes; the placement shall be such so that the drained water volume from the suction system that precedes the filter in this time lapse is of at least 0.5 litres; after testing, no water shall be present in the air filter.

3.9.2.13 Lighting of the passenger compartment.
Applicable to the urban and suburban type bodies. The lighting, with all the interior lights switched on and in the total absence of external light, shall be measured in the following points:

Seats, at 300 mm from the level of the seat

In the aisle running down the middle of the vehicle, at a height of 1500 mm from the floor.

In the seats reserved for disabled people, at 1000 mm from the floor

The minimum measured value shall reach 100 lux.

3.9.2.14 Electromagnetic compatibility.
Compulsory in the vehicles with EDC (Electronic Injection Control). Tested according to the EC Directive 95/54

3.9.2.15 Visibility in the driver's seat and door mirrors. Tested according to the EC Directives 79/795 and 88/321.

4. HOT ROLLED/DRAWN STEEL AND SCHEDULED PAINTING/PROTECTION

Index

4	**HOT ROLLED/DRAWN STEEL AND SCHEDULED PAINTING/PROTECTION**	**4-5**
4.1	HOT-ROLLED/DRAWN STEEL	4-5
4.1.1	General information	4-5
4.1.2	Type of material	4-5
4.1.3	Scope	4-5
4.1.4	Classification and features to be checked	4-5
4.1.5	Chemical composition %	4-6
4.1.6	Specifications	4-7
4.1.7	High elastic limit steel specifications	4-7
4.1.8	Raw drawn steel specifications	4-8
4.1.9	Plates and strips reference cold bending fitness	4-8
4.2	SCHEDULED PAINTING/PROTECTION	4-9
4.2.1	Purpose	4-9
4.3	GENERAL INFORMATION	4-9
4.3.1	Painting/protection cycle classification, according to the equipment type	4-9
4.4	"01" CYCLE - BUSES AND DERIVED VEHICLES, OVERSIZE BODIES, DUMPERS, TANKERS, TRAILERS, SEMITRAILERS, TRUCK MIXERS, ETC.	4-9
4.4.1	Plate pretreatment	4-9
4.4.2	Painting cycle	4-10
4.4.3	Stamping protection	4-10
4.4.4	Abrasionproof coating (optional)	4-10
4.4.5	Particular procedures	4-10
4.5	"02" CYCLE - MODIFIED CHASSIS	4-11
4.5.1	Plate pretreatment and painting cycle	4-11
4.5.2	Particular procedures	4-11

4.6	"03" CYCLE - MODIFIED CABS/BODIES (PLATES ASSEMBLED ON STRUCTURES WITH COMPLETE AND ORIGINAL IRISBUS PAINT)	4-12
4.6.1	Plate pretreatment	4-12
4.6.2	Painting cycle	4-12
4.6.3	Module protection	4-13
4.6.4	Abrasionproof coating (optional)	4-13
4.6.5	Particular procedures	4-13
4.7	"04" CYCLE - CAB AND/OR CHASSIS RE-PAINTING (THE SAME OR A DIFFERENT COLOR FROM THE ORIGINAL ONE)	4-13
4.7.1	"Cab" "frame", "frame" and "chassis" painting cycle	4-13
4.7.2	Re-painting plastic components painted in a different color from the cab one (bumpers, fenders, radiator grid and step)	4-13
4.7.3	Particular procedures	4-14
4.8	COAT OF PAINT CHECKING	4-14

4 HOT ROLLED/DRAWN STEEL AND SCHEDULED PAINTING/PROTECTION

4.1 HOT-ROLLED/DRAWN STEEL

4.1.1 General information

General purpose structural plates, strips, bars and section bars.
Features, prescriptions and tests.

4.1.2 Type of material

Products made of carbon, unalloyed, untreated steel, used to manufacture structural parts.
Hot-rolled plates and strips (4 to 50 mm thick) provided in sheets or rolls, to be used for shearing or bending and, within given limits and if previously requested in the order, forming.
Hot-rolled, drawn or cogged and, if previously requested in the order, 3 to 30 mm rectified circular, square, hexagonal plates, circular bars and section bars.
If requested in the order, rolled steel sections are provided after normalizing. Bars which are drawn by rolling are provided either raw or hardened.

4.1.3 Scope

4.1.4 Classification and features to be checked

		Features to be checked					
Steel [1]	Degree of deoxidization	Chemical composition	Tensile strength	Bending	Structure	Strength	
						0° C	- 20° C
Fe 360 C	Hardened	●	●	●		●	
Fe 360 D	Grain refined hardened	●	●	●	●		●
Fe 430 C	Hardened	●	●	●		●	
Fe 430 D	Grain refined hardened	●	●	●	●		●
Fe 510 C	Hardened	●	●	●		●	
Fe 510 D	Grain refined hardened	●	●	●	●		●

1) The letters C and D specify the steel quality, indicating the respective weldability and the degree of brittleness insensitiveness.

Recommended use:

- Fe 360 steel for details subject to medium deformations
- Fe 430 and 510 steel for details subject to slight deformations.

All steel types can be riveted or bolted as well as welded by means of arc and autogenous welding.

4.1.5 Chemical composition %

	Casting analysis					Semifinished steel analysis				
Steel	C max.	P max.	S max.	Mn max.	Si max	C max.	P max.	S max.	Mn max.	Si max.
Fe 360 C	0,17	0,040	0,045	--	--	0,20	0,045	0,050	--	--
Fe 360 D [1)]	0,17	0,040	0,040	--	--	0,19	0,045	0,045	--	--
Fe 430 C	0,19	0,040	0,045	--	--	0,22	0,045	0,050	--	--
Fe 430 D [1)]	0.19	0,040	0,040	--	--	0,21	0,045	0,045	--	--
Fe 510 C	0,20 [2)]	0,040	0,045	1,60 [3)]	0,55	0,22 [1)]	0,045	0,050	1,70 [3)]	0,60
Fe 510 D	0,20 [2)]	0,040	0,040	1,60 [3)]	0,55	0,22 [1)]	0,045	0,045	1,70 [3)]	0,60

1) Nitrogen fixing agents could be added: for example, min. 0.015% soluble Al for each casting (equal to 0.018% total Al).

2) For C degree products whose thickness exceeds 16 mm and D degree products whose thickness exceeds 30 mm, 0.22% is the maximum carbon content allowed for in casting analysis and 0.24% in semifinished steel analysis.

3) Mn contents in excess are allowed up to 1.70% for casting and 1.80% for products, with a simultaneous 0.010% reduction in C for each Mn 0.05% increase.

Chemical composition, expressed in %, of steel having high elastic limits.

Steel	C max.	Mn max.	Si max.	P max.	S max	Al max.	Nb[(1)] max.
Fe 355	0.10	0,60	0.40	0,025	0.025	0.020	0.020
Fe 420	0.11	1.00	0.40	0.025	0.025	0.020	0.030
Fe 490	0.12	1.60	0.40	0,025	0.025	0.020	0.040

1) Nb can be replaced with V or a combination of both components.

4.1.6 Specifications

Steel		Tensile test							Bending test	Strength test	
		Breaking point	Re min. elastic limit per thickness (mm)			A % minimum elongation per thickness (mm)			D/a	kv min. s ≧ 5 mm J	
			≦ 16	16 ÷ 40	> 40	> 3	3 ÷ 40	> 40		temp	
		N/mm^2	N/mm^2	N/mm^2	N/mm^2				α=180°	0 °C	-20°C
Fe 360	C	360 ÷ 460	235	225	215	21	25	24	1	28	-
	D									-	28
Fe 430	C	430 ÷ 530	270	260	250	19	22	21	2,5 (2) (*)	28	-
	D									-	28
Fe 510	C	510 ÷ 610	350	340	330	17	20	19	2	28	-
	D									-	28

(*) Values between brackets refer to straps whose thickness is <3 mm.

4.1.7 High elastic limit steel specifications

Type	Tensile test							Vickers hardness	Bending test	Strength
	Rm breaking point	R.p.O 2 min. elastic limit	Re/Rm ratio	Minimum elongation %					D/a	kV min
				1		2				J
	N/mm^2	N/mm^2	max	A_{80} (mm) s<3	A (mm) s.3	A_{80} (mm) s<3	A (mm) s.3	HV	α=180°	t=20°C
Fe 355	415 ÷ 530	335	0,89	20	25	21	26	180	0	40
Fe 420	470 ÷ 590	420	0,89	18	23	19	24	197	0,5	40
Fe 490	540 ÷ 690	490	0,89	14	19	15	20	220	1	40

1 = Sample kept perpendicular to the rolled section fibre.

2 = Sample kept parallel to the rolled section fibre

4.1.8 Raw drawn steel specifications

Semifinished steel types	Size	Tensile test	
		R min. N/mm^2 breaking point	A min. % minimum elon gation
Raw Fe 430	<10 10...<16 16...<25 25...<40 40...80	540 540 540 490 440	7 7 8 9 11
Raw Fe 510	<10 10...<16 16...<25 25...<40 40...80	650 610 610 560 540	6 7 8 9 10

4.1.9 Plates and strips reference cold bending fitness

Cold bend radius minimum values which can be achieved without cracking.

Material	Bending direction	Minimum bend radius allowed per thickness (mm)													
		1 ÷ 1,5	1,5 ÷ 2,5	2,5 ÷ 3	3 ÷ 4	4 ÷ 5	5 ÷ 6	6 ÷ 7	7 ÷ 8	8 ÷ 10	10 ÷ 12	12 ÷ 14	14 ÷ 16	16 ÷ 18	18 ÷ 20
Fe 360	Transverse	1,6	2,5	3	5	6	8	10	12	16	20	25	28	36	40
	Longitudinal	1,6	2,5	3	6	8	10	12	16	20	25	28	32	40	45
Fe 430	Transverse	2	3	4	5	8	10	12	16	20	25	28	32	40	45
	Longitudinal	2	3	4	6	10	12	16	20	25	32	36	40	45	50
Fe 510	Transverse	2,5	4	5	6	8	10	12	16	20	25	32	36	45	50
	Longitudinal	2,5	4	5	8	10	12	16	20	25	32	36	40	50	63

Weldability - The Fe 360, Fe 430 and Fe 510 types compliance to normal welding procedures and applications is guaranteed; however, we recommend to use grain refined, hardened steel rather than effervescing steel, particularly if welding is supported to reach segregation areas, thus affecting the seam strength.

4.2 SCHEDULED PAINTING/PROTECTION

4.2.1 Purpose

This section specifies the painting/protection cycle and the related coat of paint check, as provided for IVECO-authorized Body repairers and installators and recommended when equipping a vehicle on behalf of the customer.

4.3 GENERAL INFORMATION

4.3.1 Painting/protection cycle classification, according to the equipment type (see table 1)

TABLE 1

Painting/protection cycle	Type of equipment
01	Buses and derived vehicles, oversize bodies, dumpers, tankers, trailers, semitraiers, truck mixers, etc.
02	Modified chassis (for example, 3rd axle)
03	Modified cabs/vans
04	Cab and/or chassis repainting (the same or a different color from the original one)

4.4 "01" CYCLE - BUSES AND DERIVED VEHICLES, OVERSIZE BODIES, DUMPERS, TANKERS, TRAILERS, SEMITRAILERS, TRUCK MIXERS, ETC.

4.4.1 Plate pretreatment

4.4.1.1 Painting all surfaces to be welded, riveted or bolted with zinc-rich, electro-weldable paint or similar products, providing equal protection (for example: zinc strips).

4.4.1.2 Chemical or mechanical deoxidization, if needed.

4.4.1.3 Pretreatment (degreasing and phosphating or phospho-degreasing), according to the available systems.

4.4.1.4 Washing with service water.

4.4.1.5 Washing with demineralized water or service water, having ≥ 20 F hardness.

4.4.1.6 Drying.

4.4.1.7 As an alternative to 4.4.1.2 - 4.4.1.3 - 4.4.1.4 and 4.4.1.5 items, the following cycle is allowed for:

a) Sandblasting.

b) Careful removal of sand dust by means of blowing, with no oil and water compressed air.

c) Mono or bicomponent wash primer coating, gun-sprayed 5 to 10 μm thick.

d) Room temperature drying.

4.4.2 Painting cycle

4.4.2.1 Epoxy bicomponent rust preventer or equivalent coatings, gun-sprayed, ≥ 40 μm thick.

4.4.2.2 Oven or room temperature drying.

4.4.2.3 Surfaced areas check.

4.4.2.4 Surfacing, if needed.

4.4.2.5 Careful cleaning with resinous grease.

4.4.2.6 Sealing of all seams with polyurethan products, dried at room temperature.

4.4.2.7 Removal of dope in excess.

4.4.2.8 Polyurethan bicomponent or equivalent coating, ≥ 30 μm thick.

4.4.2.9 Oven or room temperature drying.

4.4.2.10 Sanding, if needed, and overall cleaning with resin-bonded grease.

4.4.2.11 Polyurethane bicomponents enamel or equivalent application, ≥ 30 μm thick.

4.4.2.12 Oven or room temperature drying.

4.4.3 Stamping protection

4.4.3.1 All stampings must be protected with oily-wax coating (required equipment: airless pump and flexible probe, provided with 360° sprinklers).

4.4.3.2 Removal of protective coat in excess.

4.4.4 Abrasionproof coating (optional)

For added ferrous parts (for example rear wheelhouses), the following must be provided for:

4.4.4.1 Cycle "01", items 4.4.1.1 to 4.4.2.12.

4.4.4.2 "Elastomeric" or equivalent coating; oven or room temperature dried.

4.4.4.3 Oven or room temperature drying.

4.4.5 Particular procedures

a) Before painting/coating "waxed" vehicles, carefully remove all wax, acting as follows:
Sprinkle with white spirit, oil or gas oil.
Let the solvent act for 5-10 minutes. Wash with hot water (50-60°C, low pressure, 5-6 bars) containing neutral detergents (for example: liquid soap, 3-5% concentrated).
Rinse with hot water. Dry thoroughly.

b) Provide any added "metallic mixed parts" with a suitable protection.

c) Provide any added "clamping elements" and "small items placed outside the cab with "DRACOMET" coating or manufacture them in "STAINLESS STEEL".

d) Provide any added "clamping elements" and "small items placed outside the chassis with "galvanization zinc plating" or "DRACOMET" coating.

4.5 "02" CYCLE - MODIFIED CHASSIS

4.5.1 Plate pretreatment and painting cycle

4.5.1.1 On raw surfaces:

4.5.1.1.1 Cycle "01", items 4.4.1.1 to 4.4.1.6.

4.5.1.1.2 As an alternative to 4.4.1.1 item, the following cycle is allowed for:

a) Careful cleaning of all raw zones (no grease, dirt or rust).

b) Mono or bicomponent wash primer coating, gun-sprayed 5 to 10 μm thick.

c) Room temperature drying.

4.5.1.2 On the chassis (modified zones and surfaces showing the original paint).

4.5.1.2.1 Careful overall cleaning.

4.5.1.2.2 Bicomponent polyurethan enameling, ≥ 30 μm thick (gloss and color according to what provided for).

4.5.1.2.3 Oven or room temperature drying.

4.5.2 Particular procedures

a) As for "01" cycle, item a)

b) As for "01" cycle, item b).

c) As for "01" cycle, item c).

4.6 "03" CYCLE - MODIFIED CABS/BODIES (PLATES ASSEMBLED ON STRUCTURES WITH COMPLETE AND ORIGINAL IRISBUS PAINT)

IMPORTANT NOTE
The following cycle is only allowed for if the IRISBUS painting cycle (cataphoresys pretreatment /priming/enameling etc.) can not be applied to the raw assembled structure (for example: oversize vehicles).

4.6.1 Plate pretreatment

4.6.1.1 Removal of oil in excess and rust, if any, painting of all seams and plate surfaces which, after assembling, will form the niche insides with zinc-rich electro-weldable paint.

4.6.1.2 As an alternative to 4.6.1.1 item, we recommend the use of plates whose internal side has been pretreated (electrically zinc plated) or prepainted (such as zincometal).

4.6.1.3 Assembling.

4.6.1.4 cycle "01", items 4.4.1.2 to 4.4.1.6.

4.6.1.5 As an alternative to 4.6.1.4 item, the following cycle is allowed for:

a) Mechanical deoxidization, if needed.

b) Degreasing with solvents.

c) Careful drying and cleaning.

d) Mono or bicomponents wash primer coating, 5 to 10 μm thick.

4.6.2 Painting cycle

On the cab internal and external raw surfaces and lower parts:

4.6.2.1 cycle "01", items 4.4.2.1 to 4.4.2.12.

4.6.2.2 If needed (color evenness, repairs due to various damages, technically difficult paper spreading, etc.), partly or wholly re-paint all the other original structure surfaces, according to the specific "04" cycle.

4.6.3 Module protection

4.6.3.1 All new modules affected by the modification shall be designed so to result easily accessible (by means of holes or openings) for internal protection.

4.6.3.2 As for "01" cycle, items 4.4.3.1 to 4.4.3.2.

4.6.4 Abrasionproof coating (optional)

On previously painted, ferrous parts, subject to crushed stone abrasion, repeat "01" cycle, items 4.4.4.2 and 4.4.4.3.

4.6.5 Particular procedures

a) As for "01" cycle, item a).

b) As for "01" cycle, item b).

c) As for "01" cycle, item c).

4.7 "04" CYCLE - CAB AND/OR CHASSIS RE-PAINTING (THE SAME OR A DIFFERENT COLOR FROM THE ORIGINAL ONE)

4.7.1 "Cab" "frame", "frame" and "chassis" painting cycle

4.7.1.1 Overall washing and drying.

4.7.1.2 Disassembling, if possible, of all movable parts whose paint is different from the cab one and paper covering of all zones not to be painted.

4.7.1.3 Checking for faulty and/or wearied parts.

4.7.1.4 "Light" sanding of all internal zones to be painted.

4.7.1.5 For plate-cleaned parts, follow "01" cycle, item 4.4.1.7. (c and d) from 4.4.2.1 to 4.4.2.10 items.

4.7.1.6 Careful cleaning with resinous cloth.

4.7.1.7 As for "01" cycle, items 4.4.2.11 and 4.4.2.12.

4.7.1.8 Reassembling all movable parts.

4.7.2 Re-painting plastic components painted in a different color from the cab one (bumpers, fenders, radiator grid and step)

In this case no repainting is possible, due to quality and technical problems (generally rough surfaces), therefore we recommend to replace any faulty part with original IRISBUS spare parts.

4.7.3 Particular procedures

a) As for "01" cycle, item a).

b) As for "01" cycle, item b).

c) As for "01" cycle, item c).

d) As for "01" cycle, item d).

4.8 COAT OF PAINT CHECKING

The coat of paint shall be checked according to what listed in table 2

TABLE 2

Features	Cycle			
	01	02	03	04
Appearance (visual test)	X	X	X	X
Thickness	X	X	X	X
Adhesion	X	X	X	X
Gloss (60° angle)	92	70	92	92 (cab) 70 (frame)
Resistance to fuel	X	X	X	X
Resistance to humidity	X	X	X	X
Salt humid resistance	350 h	250 h	500 h	-
Weatherability (Wheather-Ometer)	X		X	X (cab only)
UV with 250 h	X	X	X	X
Waterproofness (24 hours at 60°C)	X	X	X	X

5. PROCEDURES FOR DAMAGES AND/OR DENTS TO VEHICLES FORWARDED TO BODY REPAIRERS

Index

5	**PROCEDURES FOR DAMAGES AND/OR DENTS TO VEHICLES FORWARDED TO BODY REPAIRERS**	**5-5**
5.1	GENERAL INFORMATION	5-5
5.2	VEHICLE WITHDRAWAL	5-5
5.3	EX SHOP OR EX ESTABLISHED PARKING DELIVERY	5-5
5.4	EX DESTINATION DELIVERY	5-6
5.5	VEHICLE REPAIRING	5-7
5.6	VEHICLE DELIVERY TO THE SHOP AFTER EQUIPPING	5-8
5.6.1	Delivery at the Body maker expense	5-8
5.6.2	Vehicle delivery by IRISBUS-established carrier	5-8
5.6.3	Vehicle delivery to the Body maker workshop	5-8
5.7	VEHICLE PART MALFUNCTIONS	5-8
Annex (A) [Damages/missing parts service sheet]		5-9
Annex (B) [Static checkouts on the chassis]		5-10
Annex (B) [Running vehicle operation test]		5-10
Annex (C) [Procedures to be followed upon the vehicle arrival at the warehouse (buses and chassis)]		5-11
Annex (D) [Maintenance of finished buses stored into warehouses]		5-11
Annex (E) [Maintenance of the chassis in the Body maker warehouse]		5-17

5 PROCEDURES FOR DAMAGES AND/OR DENTS TO VEHICLES FORWARDED TO BODY REPAIRERS

5.1 GENERAL INFORMATION

5.1.1 The procedure is based on a damage and dents entry sheet, supplied with the vehicle from the shop to its final destination.

5.1.2 Vehicles are supplied with this sheet when leaving the shop. The person responsible for the transportation must check for the presence of this sheet or, if missing, require a duplicate.

5.1.3 Vehicles leaving established parking areas (for example, Villanova) always must have on board the sheet provided from the shop to the parking area.

5.2 VEHICLE WITHDRAWAL

According to the contractual clauses contained in the order, the delivery to the Body maker may occur as follows:

1) Ex shop or ex established parking delivery.
2) Ex destination delivery.

5.3 EX SHOP OR EX ESTABLISHED PARKING DELIVERY

5.3.1 The person charged by the Body maker of the vehicle withdrawal must check for the presence of the damage sheet and the vehicle integrity and outfits.

5.3.2 Any damage and dent must be reported to the parking area attendant, then written in the 1st strip of the sheet (in case of vehicle withdrawn from the shop) or in the 1st available strip of the same sheet (in case of vehicle withdrawn from the established parking area) and confirmed by the transferee.

5.3.3 This strip will be given to the transferee, whereas the remaining parts of the document will remain with the vehicle.

5.3.4 In case of withdrawal from the shop, even if no damages are detected, the first strip must be struck through and signed by the receiver.

5.3.5 The procedure to be followed in case of damages or dents occurred at the shop has been provided: in these cases the shop will repair any damage and dent. As for the established parking area, any damage and dent detected at the vehicle arrival will be repaired and restored at IRISBUS expense before it is withdrawn or delivered to the Body maker.
Unless exceptions, each vehicle coming out of shop or established parking area must be integer.
Particular cases must be notified, with the relevant documentation, to IVECO COLTRANSPORT, Via delle Cascinette 6, TORINO (Telex 0039 011 221690), which will deal with the procedures and indemnify the damage.

5.4 EX DESTINATION DELIVERY

5.4.1 In this case, the driver of the designed carrier must follow the procedures described at 3.1, 3.2, 3.3 and 3.4 items.

5.4.2 At the vehicle arrival, the Body maker parking area attendant, together with the carrier driver, must check for any damages or dents.

5.4.3 Any damage/dent will be reported on the first available strip: the transferee and receiver must sign in the relevant spaces.

5.4.4 The Body maker attendant will detach the corresponding strip and give it to the carrier driver.

5.5 VEHICLE REPAIRING

5.5.1 According to the rule in force between IVECO and the carrier, any damage caused by the carrier in transit must be divided into the following two categories, according to their entity:

a) Small damages, less than £ 63.50. The Body maker can directly repair the damage without previous communication to the carrier.

b) Damages over £ 63.50. The Body maker must send a repair estimate to the carrier, by telex or registered mail with return receipt, within 5 workdays following the date of receipt of the damaged vehicle.

5.5.2 A copy of this estimate must be sent to IVECO COLTRANSPORT, Via delle Cascinette 6, TORINO.

5.5.3 Within 5 workdays following the sending date of the telex or registered mail with return receipt, the carrier must contact the Body maker; if he wishes to avail himself, for the vehicle, of his insurance company he must send a copy to COLTRANSPORT; otherwise, the repair will be meant as authorized.

5.5.4 Once the repair is made, the Body maker must make out a debit note to the carrier, V.A.T. free according to DPR 633/72 article 15, 2nd comma, enclosing all the necessary receipts (damage sheet copy, failure reports, third party workshop invoices) and sending a copy of all documents to IVECO COLTRANSPORT, Via delle Cascinette 6, TORINO.

5.5.5 When sending the estimate telex, the Body maker will ask the carrier if he is interested in withdrawing the rejected parts which, in case of affirmative answer, will be available for a maximum of 45 days from this communication date.

5.5.6 After 45 days, if the carrier has not withdrawn the parts he was interested in, these will be scrapped at the Body maker expense, without any payment pro carrier.

5.6 VEHICLE DELIVERY TO THE SHOP AFTER EQUIPPING

5.6.1 Delivery at the Body maker expense

At the vehicle arrival, the Conformity department will perform the checkout, together with the driver committed by the Body maker. Any damage/dent will be reported in the 1st available strip of the damage sheet. The transferee and the receiver will sign in the relevant spaces and the Conformity department will give the corresponding strip to the transferee.
As for the damage estimation, the Conformity department will draft an estimate for repairs over £ 63.50, timely sending it to IVECO COLTRANSPORT, so that the information can be sent within 5 workdays after the date of receipt of the vehicle.

The Body maker has the right to subject the vehicle to a survey. To do so, he must inform IVECO COLTRANSPORT within 5 workdays after the sending date of the telex or registered mail with return receipt.
If no answer will be received within the set time, the repair will be meant as authorized.
Repair or restoration will be performed at the shop Conformity department expense, which will transfer the relevant documents to the administration office, so that the debit note can be made out at the Body maker expense.
The amount of this note will be deducted as a compensation for the payments still due to the Body maker.

5.6.2 Vehicle delivery by IRISBUS-established carrier

As specified in the previous item; also in this case, IRISBUS will pay the damage/dent as a compensation for the payments still due to the Body maker.

5.6.3 Vehicle delivery to the Body maker workshop

If during the test stage damaged vehicles are found out, these will not be delivered and the Body maker must proceed to the scheduled delivery by performing the relevant repair or restoration at his own expense.
The vehicle may be withdrawn at the Body maker workshop:
by the client who must receive an integer vehicle; by an IRISBUS carrier, which will deliver it to the shipment place or the final client; also in this case the Body maker must guarantee the vehicle integrity. Obviously, the carrier, at withdrawal, must perform the routine vehicle tests, according to the procedure described at 3.1, 3.2, 3.3 and 3.4 items.

5.7 VEHICLE PART MALFUNCTIONS

Any vehicle part damage/malfunction must be suitably communicated to IRISBUS IOL. Body Builders, Via Puglia 35 - TORINO, which will make the Service Department repair the vehicle.

Annex (A)

IVECO PEGASO, S.A.	**DAMAGES/MISSING PARTS SERVICE SHEET**	SHOP STORAGE CODE
WARNING: if the damage description is too long please use the following slip		
SHEET	STORAGE AREA	CARRIER
AMOUNTS	(To be struck through if there are no claims)	
TOTALS	TRANSFEROR ----------	RECEIVER ----------
SHEET	STORAGE AREA	CARRIER
AMOUNTS	(To be struck through if there are no claims)	
TOTALS	TRANSFEROR ----------	RECEIVER ----------
SHEET	STORAGE AREA	CARRIER
AMOUNTS	(To be struck through if there are no claims)	
TOTALS	TRANSFEROR ----------	RECEIVER ----------
SHEET	STORAGE AREA	CARRIER
AMOUNTS	(To be struck through if there are no claims)	
TOTALS	TRANSFEROR ----------	RECEIVER ----------
	NOTE: In case of loss the responsible is charged with any damages to the vehicle, until he gives it up to the following operator	

Annex (B)

Static checkouts on the chassis

- Install the batteries.
- Top up the radiator cups with the provided antifreeze liquid.
- Check the liquid level: pneumatic system alcohol, motor oil, change gear, power clutch, differential, power steering. Top up, if needed.
- Check the radiator fan and alternator belt tension. Adjustments, if needed.
- Check and restore the tire pressure, according the set valves.
- Adjust the wheel stop nuts and retighten after the road test (40 to 50 km) (Check the instructions on the vehicle "Operation and Maintenance" manual).
- Grease the change gear power tie rod, power clutch and propeller shaft.
- Bleed air from the power clutch circuit with the specific pump.
- Statically check the electric system and remove the detected failures.
- Bleed air from the fuel feeding circuit.
- Start and check for leakages in the pneumatic system, using water and soap.
- Check and retighten the pneumatic system, cooling system and hydraulic steering pipe fittings.
- Adjust clutch, change gear power tie rods and accelerator.
- Fix the steering wheel by means of the hexagon nut and adjust it.
- Balance the front wheels by means of the specific equipment.

Running vehicle operation test

- Cover 40 to 50 km to check the vehicle operation: suspensions, change gear, clutch, brakes, steering, acceleration, deceleration, roadholding, control equipment.
- Check the standing vehicle immediately after the test: pneumatic system, motor belt tension and liquid levels.
- Check the chassis low parts for leakages or other damages.
- Overhaul all mechanic and pneumatic parts according to what detected during the test (after the road test).
- Overhaul the electric system to remove all malfunctions detected during the test (after the road test).
- Start the vehicle (after the mechanic and electric overhauling of the detected malfunctions) and test again to be sure all faults have been corrected.

Annex (C)

Procedures to be followed upon the vehicle arrival at the warehouse (buses and chassis)

- Store the provided box.
- Operate the battery disconnection switch (if any).
- Remove the fuse from the tachograph (if any).
- Attach the suitable caution label.
- Put a wood dowel among the dowels of the automatic suspension (if any).
- Place some protection covers, as during the parking at IRISBUS, which will be requested to the carrier (for chassis only).

Annex (D)

Maintenance of finished buses stored into warehouses

1) Three-monthly cycle

1.1 Withdraw the units from the park, with move batteries, and move them into the test area.

1.2 Check the vehicle general external conditions and locate parts to be repaired (if any).

1.3 Start and run the motor at medium speed for about 10 minutes.

1.4 Check the external lights, windscreen-wipers and doors operation.

1.5 Check the coolant level.

1.6 Check the vehicle inside as regards the internal covering in those specific points considered as critical at that moment.

1.7 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

1.8 Correct any malfunction.

1.9 Check the corrections and move the vehicle to the storage area with the original equipment.

2) Half-yearly cycle

2.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

2.2 Wash the vehicle(remove the waxy protection from waxed vehicles), check its general external conditions and locate parts to be repaired (if any).

2.3 Check the external lights, windscreen-wipers and doors operation.

2.4 Check the vehicle inside as regards the internal covering.

2.5 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

2.6 Check the levels (density), Paraflu, motor oil, clutch oil, brake fluid and tire pressure, retighten the rubber manifolds.

2.7 Operation test on track for an 8 km run. Brake and ABS test. Apply protective grease, vaseline or similar, on the electric contacts, as originally provided.

2.8 Lubricate the propeller shaft, the stub axle pin, the steering ball joints (accelerator, brakes, clutch, etc.).

2.9 Correct any malfunction.

2.10 Check the correction, restore the waxy protection (if necessary) and move the vehicle to the parking area with the original equipment.

3) Nine-monthly cycle

3.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

3.2 Check the vehicle general external conditions and locate parts to be repaired (if any).

3.3 Start and run the motor at medium speed for about 10 minutes.

3.4 Check the external lights, windscreen-wipers and doors operation.

3.5 Check the coolant level.

3.6 Check the vehicle inside as regards the internal covering in those specific points considered as critical at that moment.

3.7 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

3.8 Correct any malfunction.
Check the corrections, restore the waxy protection (if necessary) and move the vehicle to the parking area with the original equipment.

4) Yearly cycle

4.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

4.2 Wash the vehicle(remove the waxy protection from waxed vehicles), check its general external conditions and locate parts to be repaired (if any).

4.3 Restore the lower parts protection.

4.4 Start and run the motor at medium speed for about 10 minutes.

4.5 Check the external lights, windscreen-wipers and doors operation.

4.6 Check the coolant level and the tire pressure.

4.7 Check the vehicle inside as regards the internal covering.

4.8 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

4.9 Test with water

4.10 Operation test on track for a 12 km run; brake and ABS test.

4.11 Check and eliminate any leakage from the pneumatic, hydraulic and cooling systems, retighten the rubber manifold brackets.

4.12 Replace motor oil, brake and clutch fluids.

4.13 Retighten the wheel nuts.

4.14 Correct any malfunction and clean the inside.

4.15 Check the waxy protection restoration (if necessary) and move the vehicle to the parking area with the original equipment.

4.16 Notify the BUS DIVISION that the bus is at the warehouse, so the IVECO technicians can check the storage conditions.

5) Fifteen-monthly cycle

5.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

5.2 Check the vehicle general external conditions and locate parts to be repaired (if any).

5.3 Start and run the motor at medium speed for about 10 minutes.

5.4 Check the external lights, windscreen-wipers and doors operation.

5.5 Check the coolant level.

5.6 Check the vehicle inside as regards the internal covering in those specific points considered as critical in that moment.

5.7 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

5.8 Correct any malfunction.

5.9 Check the waxy protection restoration (if necessary) and move the vehicle to the parking area with the original equipment.

6) Eighteen-monthly cycle

6.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

6.2 Wash the vehicle(remove the waxy protection from waxed vehicles), check its general external conditions and locate parts to be repaired (if any).

6.3 Check the external lights, windscreen-wipers and doors operation.

6.4 Check the vehicle inside as regards the internal covering.

6.5 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

6.6 Check the levels (density), Paraflu, motor oil, clutch oil, brake fluid and tire pressure, retighten the rubber manifolds.

6.7 Operation test on track for an 8 km run. Brake and ABS test. Apply protective grease, vaseline or similar, on the electric contacts, as originally provided.

6.8 Lubricate the propeller shaft, the stub axle pin, the steering ball joints (accelerator, brakes, clutch, etc.).

6.9 Replace:

Brake master and operation cylinder

Brake limit switches.

6.10 Check the correction, restore the waxy protection (if necessary) and move the vehicle to the parking area with the original equipment.

7) Twenty-one-monthly cycle

7.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

7.2 Check the vehicle general external conditions and locate parts to be repaired (if any).

7.3 Start and run the motor at medium speed for about 10 minutes.

7.4 Check the external lights, windscreen-wipers and doors operation.

7.5 Check the coolant level.

7.6 Check the vehicle inside as regards the internal covering in those specific points considered as critical at that moment.

7.7 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

7.8 Correct any malfunction.

7.9 Check the correction, restore the waxy protection (if necessary) and move the vehicle to the parking area with the original equipment.

8) Twenty-four-monthly cycle

8.1 Withdraw the units from the parking area, with move batteries, and move them to the test area.

8.2 Wash the vehicle(remove the waxy protection from waxed vehicles), check its general external conditions and locate parts to be repaired (if any).

8.3 Restore the lowest parts protection.

8.4 Start and run the motor at medium speed for about 10 minutes.

8.5 Check the external lights, windscreen-wipers and doors operation.

8.6 Check the coolant level and the tire pressure.

8.7 Check the vehicle inside as regards the internal covering.

8.8 Check the operation of:
Lights and signaling instruments on board.
Internal lighting.
Webasto.
Air conditioner.
Blow-by system.
Mirrors and/or rear windows resistance.
Refrigerator-watch-microphone.
Window regulator.
Defogging device.
Starter safety.

8.9 Test with water

8.10 Operation test on track for 12 km; brake and ABS test.

8.11 Check and eliminate leakages from the pneumatic, hydraulic and cooling systems, retighten the rubber manifold brackets.

8.12 Replace the motor oil, brake and clutch fluids.

8.13 Retighten the wheel nuts.

8.14 Correct any malfunction and clean the inside.

8.15 Check the waxy protection restoration (if necessary) and move the vehicle to the parking area with the original equipment.

8.16 Notify the BUS DIVISION that the bus is at the warehouse, so the IRISBUS technicians can check the storage conditions.

Annex (E)

Maintenance of the chassis in the Body maker warehouse

1) One or two-monthly cycle

1.1 Remove the rust from the front wheel hubs by means of glass paper and protect with grease.

1.2 Check the coverings: steering wheel cover and protection housing, bonnet, hand brake lever cover, remote control switch cover, horn protection bag, Voith deceleration gearcase, motor cover and any other panelboard covers.
Replace damaged covers, place and fix loosened covers.

2) Three-monthly cycle

2.1 Remove the covers: steering wheel cover, motor, front structures, etc. and check the vehicle general conditions.

2.2 Install the move batteries.

2.3 Start and run the motor at medium speed for about 10 minutes.

2.4 Brake many times and discharge condensation from air tanks.

2.5 Apply protective grease, vaseline or similar, on the electric contacts on which it is originally provided (kemptronic).

2.6 Retighten the rubber piping brackets of the cooling system and hydraulic feeding. Inject the protective agent for the modules, Cryla Gard IVI 833741 type or similar approved ones. Spotting-in can be performed by entering the cab.

2.7 Remove the move batteries and install the original covers.

3) Four to five-monthly cycle

Perform the operations described at item (I).
Usually these operations do not require to move the vehicle.

4) Six-monthly cycle

4.1 Remove the covers (steering wheel cover, motor, front structures, etc.) and check the vehicle general conditions.

4.2 Apply the move batteries.

4.3 Check the levels, Paraflu density, motor oil, clutch oil, brake fluid and tire pressure.

4.4 Retighten the rubber manifold brackets.

4.5 Operation test on track or rollers, for a 15 km run. Check and remove any leakage from the pneumatic, hydraulic and cooling systems.
Retighten the wheel nuts.

4.6 Grease the transmission, leaf spring pins and stub axle pins.

4.7 Spot the paint in damaged areas (with a brush).

4.8 Check the waxy protection where it has been originally applied.

4.9 Inject the protective for modules, Cryla Gard IVI 852741 type or similar approved one.

4.10 Remove the move batteries and replace the polyethylene covers with other new ones, then fix them.

5) Seven to eight-monthly cycle

Perform the operations described at item (I).
Usually these operations do not require to move the vehicle.

6) Nine-monthly cycle

6.1 Remove the covers (steering wheel cover, motor, front structures, etc.) and check the vehicle general conditions.

6.2 Install the move batteries.

6.3 Replace the motor oil, clutch and brake fluids. Check the levels, Paraflu density and tire pressure.

6.4 Retighten the rubber manifold brackets.

6.5 Operation test on track or rollers, for a 15 km run. Check and eliminate leakages from the pneumatic, hydraulic and cooling systems.
Retighten the wheel nuts.

6.6 Grease the transmission, leaf spring pins and stub axle pins.

6.7 Spot the paint in damaged areas (with a brush).

6.8 Check the waxy protection where it has been originally applied.

6.9 Inject the protective for modules, Cryla Gard IVI 852741 type or similar approved one.

6.10 Remove the move batteries and replace polyethylene covers with new ones, then fix them.

7) Ten to eleven-monthly cycle

Perform the operations described at item (I).

8) Yearly cycle

Notify the Bus Division that the bus is at the warehouse, so the IRISBUS Technicians can check the storage conditions.